# NOTES ON BROMELIACEAE, XXIII

Lyman B. Smith

---

## VRIESEA

Vriesia Lindley, Botanical Register 29: pl. 10. 1843. Name conserved as "Vries*ea*" in the International Code of Botanical Nomenclature, cf. Taxon 8: 232. 1959. Type: *V. psittacina* (W. J. Hooker) Lindley (*Tillandsia psittacina* W. J. Hooker). Not *Vriesia* Hassk. 1842.

*Hexalepis* Raf. Fl. Tellur. 4: 24. 1838.

*Thecophyllum* sensu Mez, Bull. Herb. Boiss. ser. II. 3: 131. 1903, in greater part, not André 1889; cf. Smith & Pittendrigh. Journ. Washington Acad. Sci. 43: 401. 1953.

*Vriesea* subgenus *Alcantarea* E. Morren ex Mez in Mart. Fl. Bras. 3, pt. 3: 516. 1894.

*Cipuropsis* Ule, Verhandl. Bot. Ver. Brandenburg 48: 148. 1907; Smith & Pittendrigh, Journ. Washington Acad. Sci. 43: 404. 1953.

*Neovriesia* Britton in Britton & Wilson, Sci. Survey Porto Rico 5: 141. 1923.

*Alcantarea* (E. Morren ex Mez) Harms, Notizblatt 10: 802. 1929.

LEAVES *always entire*, rosulate; blades predominantly ligulate and inconspicuously lepidote, often banded or mottled. SCAPE usually well developed. INFLORESCENCE simple or compound; spikes usually distichous-flowered, often secund-flowered as well. FLORAL BRACTS conspicuous, enfolding or concealing the bases of the flowers. FLOWERS mostly subsessile or with short thick pedicels. PETALS *free or very short-connate*, ligulate, *bearing two scales each* (Mez's report of a single scale each in *V. triligulata* Mez never verified), firm and erect or soon flaccid and drooping. STAMENS included or exserted. OVARY nearly or quite superior; style elongate. OVULES many, usually caudate. FRUIT capsular. SEEDS fusiform with a *long straight basal coma*.

Mexico and the West Indies to Peru, Bolivia, Paraguay, and northern Argentina, with the greatest concentration of species in eastern Brazil and the next largest in Costa Rica.

The present synopsis is written as much for the amateur as for the professional botanist and therefore explains some matters that would seem self-evident to the latter. For the same reason, a large number of old species are illustrated to facilitate the identification of those in cultivation.

As indicated in the bibliography above, there has been considerable difficulty in settling on the correct orthography or spelling of the genus as well as much disagreement on its definition and limits. In his original publication of the genus, Lindley dropped the final "e" from the name of the Dutch botanist, Dr. W. de Vriese, and gave it a Latin form by adding "ia" to the end. Later botanists, beginning with Beer, considered this grammatically incorrect and used de Vriese's full family name plus a final "a". In 1906 in the first list of conserved generic names in the report on the International Botanical Congress of Vienna, Vriesea was chosen in preference to the earlier Hexalepis. This saved us from losing one of the most familiar names in the Bromeliaceae, but caused confusion by using the second spelling with the original publication and giving no reason for the substitution. Each spelling has precedents that can be interpreted in its support or the matter would have been settled long ago, so the question was raised again and the committee on the conservation of generic names gave a ruling in favor of the second spelling, "Vriesea", with a definite clarification of its use. So this nagging irritation is laid to rest and we can proceed to more important matters.

The confusion about the limits of Vriesea is a much more serious matter than its spelling. Lindley and his predecessor, Rafinesque, used the same species, the former Tillandsia psittacina, to typify the new genus, and made the same distinction of appendages on the petals in Vriesea and none in Tillandsia. Because of the lack of good petals in most herbarium material, professional botanists have tried desperately to find some other characters that will correlate with the basic one of petal-appendages. André erected Thecophyllum on the basis of large primary bracts and aborted branches without seeing any petal structure. Mez, also without benefit of petals, reduced it to a section of Guzmania in his first monograph and later discovering free appendaged petals in supposed species of Thecophyllum, restored it to generic status as closely allied to Vriesea. In practice, the character of aborted branches breaks down, and of André's two original species Thecophyllum wittmackii proves to be a Guzmania and T. poortmanii remains unverified. The net result is that most of the species treated as Thecophyllum in Mez's second monograph in the Pflanzenreich and by myself in the North American Flora go into Vriesea, a few into Guzmania, and a very few into Tillandsia.

Another source of confusion lies in the close habital resemblance of certain Andean species of Vriesea with their much commoner neighbors in Tillandsia due to their narrowly triangular leaf-blades or relatively small flowers or both characters together. Mez tried to evade this difficulty by considering their petal-appendages to be a different kind of structure than those of typical Vriesea, that is laterally produced auricles rather than terminally produced scales. I have tried to follow him in this but can no longer convince myself of any real distinction.

Cipuropsis was based on a single species and never reached cultivation, and Neovriesia was an unnecessary name when published, as Hexalepis was already available to Britton when he followed the American Code in search of strict priority. Both cases are technicalities that the amateur can happily ignore.

The attempt to make a separate genus of Alcantarea on the basis of an apical as well as a basal coma on the seed and flaccid petals is more logical than the previous examples, but pending more evidence, it seems best not to change Mez's system unless a definite improvement can be made. His division of the subgenus Vriesea (as Euvriesea) into two sections, Vriesea (as Genuinae) with exserted stamens and Xiphion with included, also appears logical as the line between the two breaks down in the vicinity of Rio de Janeiro in certain species with compound inflorescences, and thus does not warrant higher rank for the two groups. Incidentally, this merging, as well as the heavy concentration of species of all three parts of the genus, would indicate that the area around Rio de Janeiro is the probable place of origin of Vriesea. Mez's subgenus Conostachys has the floral characters of section Vriesea and merges so gradually that its character of flowers in more than two ranks is not usable except to distinguish species. The subdivisions of Vriesea may be summarized as follows:

1. Seed with the apical appendage minute and undivided; petals firm and remaining more or less erect after anthesis. Subgenus VRIESEA
    2. Stamens exserted; bracts mostly brightly colored with red, orange, or yellow............................Section VRIESEA
    2. Stamens included; bracts mostly dull green or brownish. Section XIPHION
1. Seed with the apical appendage divided into a short coma; petals soon flaccid and drooping.........Subgenus ALCANTAREA

As far as information permits, the text of this paper is ordered in accordance with the above classification, but the position of many species is tentative and is so noted. The key to species is designed primarily as a tool of identification and makes no pretense of being natural. However, by happy coincidence, it frequently brings together large groups of closely related species. Cross references are given to several species of Tillandsia whose ligulate leaf-blades tend to make them confused with Vriesea when they lack petals.

## ARTIFICIAL KEY TO SPECIES

1. Flowers in exactly 2 ranks but sometimes twisted until secund.
    2. Flowers not secund except sometimes insofar as the petals are exserted from the bracts on one side.
        3. Leaf-blades narrowly triangular, usually densely lepidote.
            4. Inflorescence compound...............................Subkey I
            4. Inflorescence simple...................................Subkey II
        3. Leaf-blades ligulate to linear, not tapering evenly from base to apex, usually glabrous or obscurely lepidote.
            5. Inflorescence compound.
                6. Upper scape-bracts equaling or exceeding the internodes. Subkey III
                6. Upper scape-bracts shorter than the internodes...Subkey IV
            5. Inflorescence simple.
                7. Scape straight or ascending; inflorescence erect.

8. Flowers all erect, either imbricate or appressed to the rhachis.......................................Subkey V
8. Flowers (at least the lowest ones) not imbricate, spreading or divergent with evident space between them. Subkey VI
7. Scape decurved; inflorescence pendulous.........Subkey VII
2. Flowers secund at anthesis and after; floral bracts often secund as well; stamens almost always included.
9. Inflorescence compound...........................Subkey VIII
9. Inflorescence simple...............................Subkey IX
1. Flowers in more than 2 ranks, polystichous, or so few that their relative position is not evident.
10. Inflorescence compound; stamens included............Subkey X
10. Inflorescence simple; stamens mostly exserted......Subkey XI

SUBKEY I

1. Flowers imbricate.
2. Spikes much longer than the primary bracts; sepals not over 25 mm long; leaf-sheaths dark castaneous or ferruginous.
3. Floral bracts convex, ecarinate; sepals 16-25 mm long.
4. Sepals exceeding the floral bracts. Ecuador, Peru. 1. *V*. *hitchcockiana*
4. Sepals equaling or shorter than the floral bracts.
5. Spikes subterete, very narrow; floral bracts 27 mm long. Pl. I, fig. 1. Peru.........................2. *V*. *rauhii*
5. Spikes strongly complanate; floral bracts 35-50 mm long.
6. Floral bracts 35 mm long, nerved. Peru...3. *V*. *cereicola*
6. Floral bracts 40-50 mm long, nearly even. Venezuela, Colombia...............................4. *V*. *robusta*
3. Floral bracts carinate.
7. Sepals 23 mm long; inflorescence pendent. Pl. I, figs. 2-4. Peru..............................5. *V*. *olmosana*
7. Sepals 8-13 mm long.
8. Spikes straight; inflorescence digitate; petals denticulate.
9. Scape little if any longer than the spikes; petals pale green. Nicaragua to Peru...........64. *V*. *chontalensis*
9. Scape much longer than the spikes; petals white. Colombia............................65. *V*. *crenulipetala*
8. Spikes nearly all geniculate, spreading abruptly from the long erect sterile base; inflorescence pinnate.
10. Inflorescence tripinnate; spikes flabellate at the ends of the branches. Ecuador.........66. *V*. *appendiculata*
10. Inflorescence not more than bipinnate.
11. Floral bracts distinctly and densely lepidote; spikes oblong or linear; petals crenulate or lacerate.
12. Inflorescence lax, 15-20 cm long; spikes many-flowered with bracteate sterile bases. Venezuela to Bolivia. 67. *V*. *heterandra*
12. Inflorescence dense, 7 cm long; spikes few-flowered with naked sterile bases. Venezuela...68. *V*. *lacera*

11. Floral bracts obscurely lepidote, appearing glabrous; spikes lanceolate; petals nearly or quite entire, lilac or white. Pl. I, fig. 5. Mexico, West Indies, Venezuela, Colombia.............69. V. didistichoides

2. Spikes (at least the lowest) less than twice as long as the primary bracts; sepals 8-48 mm long.

13. Sepals 8-10 mm long. Pl. I, fig. 6. Colombia, Ecuador. 70. V. fragrans

13. Sepals 22-48 mm long.

14. Floral bracts 60 mm long; spikes lanceolate, densely 4-5-flowered. Ecuador..........................71. V. drewii

14. Floral bracts 22-40 mm long.

15. Inflorescence erect.

16. Floral bracts nearly all convex and ecarinate, 24 mm long. Pl. I, fig. 7. Colombia, Ecuador. 6. V. cylindrica

16. Floral bracts carinate.

17. Spikes many-flowered, much exserted above the primary bracts; floral bracts 30-40 mm long, diffusely lepidote. Pl. I, fig. 8. Peru...........7. V. harmsiana

17. Spikes few-flowered, almost wholly covered by the primary bracts; floral bracts 23 mm long, densely lepidote. Pl. I, fig. 9. Peru......8. V. tillandsioides

15. Inflorescence pendulous.

18. Floral bracts much exceeding the sepals, 40 mm long. Ecuador.............................9. V. arpocalyx

18. Floral bracts equaling or shorter than the sepals, 22 mm long. Venezuela to Peru............10. V. tequendamae

1. Flowers lax.

19. Floral bracts much exceeding the sepals, 35 mm long. Colombia...................................11. V. pereziana

19. Floral bracts from about equaling to much shorter than the sepals. Brazil.

20. Primary bracts much shorter than the spreading branches of the broad lax inflorescence; floral bracts 18-25 mm long, about equaling the sepals. Pl. I, fig. 10. 12. V. lubbersii

20. Primary bracts much exceeding the short strict branches of the slenderly cylindric inflorescence; floral bracts 8-10 mm long, one-half or one-third as long as the sepals. Pl. I, fig. 11.......................72. V. drepanocarpa

SUBKEY II

1. Floral bracts much shorter than the sepals, fleshy-coriaceous, suborbicular; inflorescence lax. Brazil..73. V. goniorachis

1. Floral bracts equaling to much exceeding the sepals; inflorescence dense or subdense.

2. Leaf-blades with brown cross-bands; inflorescence 3-flowered. Costa Rica...............................74. V. jimenezii

2. Leaf-blades concolorous; inflorescence few-many-flowered.

3. Leaf-blades green, obscurely lepidote.

4. Floral bracts to 50 mm long, much exceeding the sepals. Venezuela..................................75. V. sulcata
4. Floral bracts 25 mm long, about equaling the sepals. Brazil..............................13. V. triangularis
3. Leaf-blades cinereous from a complete covering of scales.
5. Rhachis broadly winged and enfolding the bases of the flowers.
6. Inflorescence complanate, 35 mm wide. Ecuador. 14. V. barclayana
6. Inflorescence terete, 7 mm in diameter. Peru. 3. V. cereicola
5. Rhachis not more than angled.
7. Floral bracts convex and ecarinate, 45 mm long; stamens exserted. Ecuador, Peru...................15. V. patula
7. Floral bracts carinate, to 16 mm long; stamens included. Nicaragua to Peru....................64. V. chontalensis

SUBKEY III

1. Flowers all erect and contiguous at anthesis.
2. Floral bracts black, fleshy; sterile bracts of the branches remote. Brazil.............................76. V. funebris
2. Floral bracts paler.
3. Sepals exserted above the floral bracts.
4. Lower spikes covered by the primary bracts; sepals 10-16 mm long (cf. Tillandsia cowellii, fusco-guttata).
4. Lower spikes and all others much exceeding the primary bracts; sepals ca. 40 mm long. Brazil.
5. Primary bracts shorter than the elongate sterile bases of the branches; floral bracts obtusely carinate, 35 mm long. Pl. I, fig. 12..................16. V. gravisiana
5. Primary bract equaling the short sterile base of the lateral branch; floral bracts ecarinate, less than 25 mm long.................................17. V. sincorana
3. Sepals covered by the floral bracts.
6. Scape very short and hidden by the leaves; spikes linear, 45-60 cm long. British Guiana........77. V. soderstromii
6. Scape well developed.
7. Leaf-blades marked with dark wavy cross bands or spots.
8. Floral bracts 30 mm long, lustrous (cf. Tillandsia roezlii).
8. Floral bracts 55-60 mm long, subchartaceous and nerved when dry. Pl. I, figs. 13, 14. Trinidad. 78. V. glutinosa
7. Leaf-blades concolorous.
9. Inflorescence tripinnate at least at base.
10. Floral bracts broadly convex toward apex and weakly if at all carinate; sepals 9-40 mm long (cf. Tillandsia boliviana, denudata, excelsa, fendleri, guatemalensis, maxima, platyphylla, rubella, selleana, tovarensis, werckleana).
10. Floral bracts sharply carinate toward apex.

11. Floral bracts to 33 mm long, rapidly decreasing in size upward (cf. *Tillandsia stenoura*).

11. Floral bracts 17-25 mm long, gradually decreasing in size upward.

12. Posterior sepals carinate (cf. *Tillandsia acuminata*, *duidae*, *krukoffiana*).

12. Posterior and anterior sepals all ecarinate. Colombia..............................79. *V. elata*

9. Inflorescence not more than bipinnate.

13. Floral bracts ecarinate.

14. Inflorescence digitate or subdigitate from a few spikes.

15. Leaf-sheaths densely ferruginous-lepidote, strongly contrasting with the blades; sepals to 15 mm long. Pl. I, fig. 15. Trinidad, Colombia, Peru. 80. *V. chrysostachys*

15. Leaf-sheaths greenish or purplish, not contrasting much with the blades; sepals 24-40 mm long (cf. *Tillandsia fendleri* (var.), *grandis*, *lucida*).

14. Inflorescence amply pinnate.

16. Sepals 12-17 mm long.

17. Floral bracts prominently nerved, rather thin; sepals 12-15 mm long (cf. *Tillandsia rubella*, *selleana*).

17. Floral bracts even, coriaceous; sepals to 17 mm long. Costa Rica...............81. *V. camptoclada*

16. Sepals 24-40 mm long.

18. Floral bracts obovate, broadly subtruncate, 32 mm long, narrow and exposing most of the alate rhachis. Colombia......................82. *V. hodgei*

18. Floral bracts elliptic or ovate, broadest at or below the middle (cf. *Tillandsia carnosa*, *denudata*, *fendleri*, *grandis*, *rauhii*).

13. Floral bracts sharply carinate toward apex.

19. Primary bracts equaling or exceeding the lower spikes (cf. *Tillandsia* spp. of West Indies, Mexico, Central America, and Andean South America).

19. Primary bracts much shorter than all of the spikes.

20. Leaf-blades densely and conspicuously cinereous-lepidote at least beneath (cf. *Tillandsia arguta*, *fassettii*, *fusiformis*, *kuntzeana*, *oerstediana* - cf. below in "Miscellaneous Notes", *superba*).

20. Leaf-blades obscurely lepidote to glabrous.

21. Leaf-blades attenuate at apex but otherwise ligulate

22. Spikes reflexed (cf. *Tillandsia somnians*).

22. Spikes erect or suberect.

23. Floral bracts 40-45 mm long; spikes long-stipitate (cf. *Tillandsia deppeana*).

23. Floral bracts 20-23 mm long.

24. Floral bracts oblong, nerved (cf. *Tillandsia dubia*).

24. Floral bracts elliptic, even. Peru.

83. *V. subandina*
21. Leaf-blades acute or rounded and apiculate.
25. Floral bracts 40-50 mm long (cf. *Tillandsia heterophylla, lajensis, sigmoidea*).
25. Floral bracts 15-35 mm long.
26. Floral bracts narrow and revealing the alate rhachis at anthesis.
27. Spikes 7 cm long; floral bracts nerved (cf. *Tillandsia zamorensis*).
27. Spikes to 25 cm long; floral bracts even. Trinidad, northern South America........84. *V. rubra*
26. Floral bracts broad, but sometimes inrolled and revealing the rhachis.
28. Floral bracts coriaceous, even (cf. *Tillandsia aequatorialis, denudata, pyramidata, reversa, stenoura, superba*).
28. Floral bracts thin, nerved.
29. Floral bracts not over 26 mm long (cf. *Tillandsia brevilingua, hamaleana, wagneriana*).
29. Floral bracts maximally 32-35 mm long. Brazil.
30. Spikes 8-14-flowered with one or no sterile bracts at base; floral bracts sparsely lepidote toward apex, 27-32 mm long. Pl. I, fig. 16....................18. *V. schwackeana*
30. Spikes 6-8-flowered with 1-5 sterile bracts at base; floral bracts sparsely lepidote throughout, 35 mm long........19. *V. pinottii*
1. Flowers (or at least the lowest) lax, more or less spreading.
31. Pedicels slender, 1-2 cm long, exceeding the floral bracts. Costa Rica..............................85. *V. pedicellata*
31. Pedicels stout, usually much less than 1 cm long, always much shorter than the floral bracts.
32. Primary bracts equaling or exceeding the lowest branches.
33. Sepals acute, all ecarinate, maximally 20-30 mm long. Brazil.................................86. *V. sceptrum*
33. Sepals obtuse to subtruncate or retuse, carinate (posterior), maximally 9-20 mm long.
34. Sepals retuse, distinctly lepidote with rather coarse free-margined scales. Venezuela.........87. *V. egregia*
34. Sepals obtuse or subtruncate, glabrous or with obscure punctiform scales (cf. *Tillandsia biflora, ionochroma, stipitata, wangerinii*).
32. Primary bracts all shorter than their axillary branches.
35. Inflorescence cylindric, dense to lax.
36. Sepals maximally 33-35 mm long.
37. Floral bracts exceeding the sepals (cf. *Tillandsia thyrsigera*).
37. Floral bracts shorter than the sepals. Pl. I, fig. 17. Brazil............................20. *V. friburgensis*
36. Sepals not over 24 mm long.
38. Inflorescence tripinnate; floral bracts nerved.
39. Floral bracts much shorter than the sepals, ecarinate.

Colombia............................88. *V. hospitalis*
39. Floral bracts about equaling to distinctly exceeding the sepals, carinate.
40. Spikes broadly ovate, subdense. Colombia. 89. *V. magdalenae*
40. Spikes elongate, very lax (cf. *Tillandsia delicatula*).
38. Inflorescence not more than bipinnate.
41. Sepals 9-10 mm long; floral bracts strongly nerved (cf. *Tillandsia singularis, truncata*).
41. Sepals 16-24 mm long; floral bracts faintly nerved to even.
42. Floral bracts about 5 times as long as the internodes, conduplicate, sharply carinate (cf. *Tillandsia carrierei*).
42. Floral bracts only 2-3 times as long as the internodes, convex, faintly if at all carinate.
43. Sepals 24 mm long, about equaling the oblong-elliptic floral bracts; pedicels to 8 mm long. Costa Rica. 90. *V. ranifera*
43. Sepals 17 mm long, much exceeding the suborbicular floral bracts; pedicels short. Brazil. 91. *V. thyrsoidea*
35. Inflorescence broad, lax.
44. Floral bracts 7-17 mm long, ovate to reniform, mostly covering only about half of each sepal.
45. Floral bracts ovate or elliptic, distinctly longer than wide (cf. *Tillandsia asplundii, laxissima, pinnata, venusta*).
45. Floral bracts suborbicular to reniform. Brazil.
46. Scape decurved; inflorescence pendulous; floral bracts to 15 mm long...................21. *V. billbergioides*
46. Scape and inflorescence erect.
47. Inflorescence tripinnate with its lower branches divided and recurving; floral bracts 7 mm long. 22. *V. leptantha*
47. Inflorescence bipinnate; floral bracts 10-17 mm long, sharply carinate. Pl. I, fig. 18. 23. *V. rodigasiana*
44. Floral bracts 20-50 mm long.
48. Rhachis of the spike slender, about 2 mm in diameter.
49. Floral bracts strongly incurved and carinate.
50. Sepals exceeding the coriaceous floral bracts, 20-30 mm long; lower primary bracts subfoliaceous. Brazil............................86. *V. sceptrum*
50. Sepals shorter than the floral bracts; primary bracts not at all foliaceous.
51. Flowers sessile (cf. *Tillandsia dyeriana, hamaleana*).
51. Flowers on stout but distinct pedicels to 5 mm long.
52. Sterile bases of the branches short, naked or with a single bract. Pl. I, fig. 16. Brazil. 18. *V. schwackeana*
52. Sterile bases of the branches elongate with several

bracts. Brazil..................24. V. brusquensis

49. Floral bracts nearly or quite straight toward apex, often ecarinate.
  53. Leaf-blades acuminate.
    54. Floral bracts suberect, about 3 times the internodes, exceeding the sepals; sepals 17 mm long, short-connate (cf. Tillandsia maculata).
    54. Floral bracts subspreading, 1-2 times the internodes, shorter than the sepals; sepals 26-29 mm long.
      55. Scape-bracts apiculate, the upper ones much reduced; stamens equaling or exceeding the petals. Brazil.
25. V. neoglutinosa
      55. Scape-bracts acuminate, all large and subfoliaceous; stamens included. Pl. I, fig. 19. Brazil.
92. V. altodaserrae
  53. Leaf-blades more or less rounded and apiculate.
    56. Sepals acute; leaf-sheaths purple. Brazil.
      57. Sterile bases of the branches bracteate.
26. V. muelleri
      57. Sterile bases of the branches naked.
93. V. haematina
    56. Sepals obtuse; leaf-sheaths pale green throughout or castaneous toward base, sometimes red-spotted.
      58. Leaf-blades densely cinereous-lepidote, red-spotted. Pl. I, figs. 20, 21. Brazil.....27. V. saundersii
      58. Leaf-blades green, soon glabrous.
        59. Floral bracts sharply carinate for most of their length, about 4 times as long as the internodes. Brazil..........................94. V. monacorum
        59. Floral bracts slightly if at all carinate, mostly much less than 4 times as long as the internodes.
          60. Primary bracts exceeding the short bracteate or naked sterile bases of the branches. Pl. I, fig. 17. Brazil, Paraguay, Argentina.
20. V. friburgensis
          60. Primary bracts shorter than the long bracteate sterile bases of the branches. Pl. I, fig. 22. Trinidad, Guiana, Brazil..........28. V. procera

48. Rhachis of the spike stout, much more than 2 mm in diameter.
  61. Floral bracts very broadly acute to obtuse or truncate, usually ecarinate.
    62. Rhachis straight; floral bracts about as long as the internodes (cf. Tillandsia rariflora).
    62. Rhachis flexuous to geniculate; floral bracts much longer than the internodes.
      63. Rhachis broadly alate with relatively short internodes (cf. Tillandsia platyrhachis).
      63. Rhachis scarcely if at all alate.
        64. Sepals less than 20 mm long.
          65. Floral bracts and sepals strongly nerved; leaf-apex soft (cf. Tillandsia platyphylla).

65. Floral bracts and sepals even; leaf ending with a hard acuminate cusp. Colombia..95. V. killipiana

64. Sepals 30-50 mm long.

66. Floral bracts suborbicular, strongly gibbous.

67. Flowers to 8 cm long; rhachis geniculate. Brazil. 218. V. extensa

67. Flowers to 12.5 cm long; rhachis unknown. Pl. I, fig. 23. Panama, Jamaica (?).......219. V. alta

66. Floral bracts narrower, mostly straight along the apical half.

68. Rhachis geniculate. Pl. I, fig. 24. Brazil. 220. V. geniculata

68. Rhachis merely flexuous.

69. Floral bracts about as long as the internodes, dull. Pl. I, fig. 25. Brazil..96. V. gigantea

69. Floral bracts 2-3 times the internodes, glaucous. Mexico. (cf. Tillandsia viridiflora).

61. Floral bracts acute, carinate; petals flaccid after anthesis. Brazil.

70. Rhachis scarcely if at all geniculate; floral bracts not more than twice as long as the internodes at anthesis. Pl. II, fig. 1............221. V. regina

70. Rhachis strongly geniculate; floral bracts more than twice as long as the internodes. Pl. II, fig. 2. 222. V. brasiliana

## SUBKEY IV

1. Inflorescence subcorymbose, only 45 mm long, its primary bracts involucrate below it; sepals 22 mm long, much exceeding the floral bracts. Brazil...............97. V. paradoxa

1. Inflorescence elongate, much exceeding its primary bracts.

2. Upper scape-bracts imbricate, only the lower ones shorter than the internodes (cf. Tillandsia asplundii, delicatula, laxissima, truncata).

2. Upper scape-bracts shorter than the internodes and usually the others also.

3. Branches of the inflorescence 2-3 cm long. Costa Rica.

4. Sepals 21 mm long; pedicels 6 mm long......98. V. latissima

4. Sepals 10 mm long; pedicels 11 mm long.....99. V. turbinata

3. Branches of the inflorescence much more than 3 cm long.

5. Scape decurved; inflorescence pendulous; floral bracts suborbicular to broadly ovate, much shorter than the sepals, membranaceous. Brazil.

6. Axis of the inflorescence geniculate; leaf-blades rounded. 21. V. billbergioides

6. Axis of the inflorescence nearly straight; leaves subobtuse...............................100. V. languida

5. Scape straight or ascending; inflorescence erect.

7. Primary bracts much exceeding the short sterile naked bases of the branches.

8. Floral bracts about equaling to exceeding the sepals.

9. Inflorescence 3-4-pinnate; sepals 17 mm long (cf. Tillandsia maculata).
9. Inflorescence bipinnate; sepals 24 mm long. Brazil.
101. V. triligulata
8. Floral bracts shorter than the sepals.
10. Inflorescence dense, its branches erect; bracts and sepals castaneous. Brazil............102. V. maculosa
10. Inflorescence lax, its branches divergent to spreading; bracts and sepals yellow or greenish.
11. Floral bracts elliptic, ecarinate, but little shorter than the sepals (cf. Tillandsia venusta).
11. Floral bracts suborbicular, carinate, about half as long as the sepals. Pl. I, fig. 18. Brazil.
23. V. rodigasiana
7. Primary bracts shorter than the long, usually bracteate, sterile bases of the branches.
12. Sepals 35-50 mm long; floral bracts humped below the apex, strongly rugose on drying. Brazil.
218. V. extensa
12. Sepals not more than 29 mm long.
13. Floral bracts about equaling the internodes or slightly more; branches usually spreading.
14. Leaves acuminate; stamens exserted. Brazil.
25. V. neoglutinosa
14. Leaves broadly acute or rounded and apiculate; stamens included. Pl. I, fig. 22. Trinidad, Guiana, Brazil
28. V. procera
13. Floral bracts much exceeding the internodes; branches erect or ascending. Brazil.
15. Floral bracts sharply carinate; branches subequal.
103. V. stricta
15. Floral bracts ecarinate; the terminal branch much larger and with a longer sterile base than the lateral ones.........................104. V. minarum

SUBKEY V

1. Sepals (or the highest or lowest) exceeding the broad floral bracts.
2. Floral bracts coriaceous, even, white-lepidote (cf. Tillandsia excavata).
2. Floral bracts rather thin, nerved, nearly or quite glabrous.
3. Inflorescence many-flowered, to 27 cm long, exceeding the leaves; floral bracts scarcely or not at all carinate. Brazil.................................29. V. gradata
3. Inflorescence few-flowered, 6-12 cm long, about equaling the leaves; floral bracts sharply carinate. Brazil.
30. V. modesta
1. Sepals equaling the floral bracts or shorter.
4. Floral bracts carinate so far as visible, pale or brightly colored, green, yellow, or red.

……

5. Apical half of the floral bract spreading and not imbricate even before anthesis; keel of the floral bracts straight or concave toward the base, convex toward the apex; inflorescence broadly rounded at apex.

6. Floral bracts acuminate, 60-70 mm. long. Pl. II, fig. 3. Brazil............................31. V. erythrodactylon
6. Floral bracts broadly acute, about 45 mm long. Pl. II, fig. 4. Central America and Colombia to Bolivia and Brazil............................105. V. heliconioides
5. Apical half (as well as the remainder) of the floral bract imbricate until after anthesis; keel of the floral bracts evenly convex; inflorescence usually acute.
7. Floral bracts densely lepidote.
8. Indument of the floral bracts red-brown; floral bracts so crowded as to be nearly horizontal. Pl. II, fig. 5. Brazil, ("Ecuador")...................32. V. barilletii
8. Indument of the floral bracts cinereous; floral bracts much less crowded, suberect. Brazil..33. V. vulpinoidea
7. Floral bracts glabrous or very sparsely and obscurely lepidote.
9. Margins of the floral bracts with a strong almost semicircular curve.
10. Inflorescences several in each rosette, lateral; scape-bracts distichous; posterior sepals carinate (cf. Tillandsia multicaulis).
10. Inflorescence single, central; scape-bracts polystichous; sepals ecarinate. Brazil.
11. Floral bracts with obtusely angled margins, bright red with broad yellow margins, 45-60 mm long; inflorescence oblong to linear, 15-40 cm long. Pl. II, fig. 6....................................34. V. incurvata
11. Floral bracts with evenly curved margins, 40-50 mm long; inflorescence usually lanceolate or elliptic.
12. Inflorescence very dense; each floral bract more than half covered by the one below it, red with yellow or green margins, its keel slightly curved. Pl. II, fig. 7...............................35. V. inflata
12. Inflorescence subdense; each floral bract less than half covered by the one below it, its keel strongly curved.
13. Sepals 38 mm long. Pl. II, fig. 8.
36. V. petropolitana
13. Sepals 27 mm long.....................19. V. pinottii
9. Margins of the floral bracts lightly curved.
14. Floral bracts 6-13 cm long, 2-3 times as long as the sepals, wholly green or red.
15. Floral bracts attenuate, straight, 11-13 cm long; posterior sepals carinate (cf. Tillandsia monstrum).
15. Floral bracts acute, incurved, 6-8 cm long; sepals all ecarinate. Pl. II, figs. 9, 10. Tobago, Trinidad, Guiana, Venezuela.....................37. V. splendens

14. Floral bracts not over 5 cm long, about twice as long as the carinate sepals at most, mostly bicolorous.
  16. Inflorescence subquadrate, almost as broad as long; scape very slender. Pl. II, fig. 11. Brazil. 38. _V_. _carinata_
  16. Inflorescence much longer than broad; scape stouter.
    17. Side of the floral bract about 3 mm wide, 30 mm long, membranaceous, nerved (cf. _Tillandsia dubia_).
    17. Side of the floral bract 10-15 mm wide, 40-50 mm long.
      18. Scape elongate, exceeding the leaves; plant flowering 5-8 dm high; floral bracts coriaceous (cf. _Tillandsia heterophylla_).
      18. Scape not exceeding the leaves; plant flowering 2.5-5 dm high.
        19. Inflorescence much exceeding the leaves, 16-26 cm long, much more than 3 times as long as broad; floral bracts 45-50 mm long; sepals narrowly elliptic, obtuse or emarginate. Pl. II, fig. 12. 39. _V_. _duvaliana_
        19. Inflorescence barely or not exceeding the leaves, 11 cm long, much less than 3 times as long as broad; floral bracts 40 mm long; sepals lance-ovate, acute. Pl. II, fig. 13...........40. _V_. _paraibica_

4. Floral bracts ecarinate or nearly so.
  20. Floral bracts bicolorous, dark castaneous and coriaceous except for the pale soft apex, 3-8 cm long. Brazil. 106. _V_. _longicaulis_
  20. Floral bracts uniform or nearly so.
    21. Floral bracts appearing rugose, at least under a lens.
      22. Floral bracts thin or subpapyraceous when dry.
        23. Scape-bracts broadly ovate; sepals narrowly elliptic, 24 mm long. Brazil...................41. _V_. _rhodostachys_
        23. Scape-bracts foliaceous or subfoliaceous; sepals broadly oblong-elliptic, 18 mm long. Guatemala. 107. _V_. _pycnantha_
      22. Floral bracts thick, rigid, coriaceous.
        24. Leaves broadly acute or obtuse, apiculate.
          25. Floral bracts barely imbricate. Costa Rica. 108. _V_. _rugosa_
          25. Floral bracts 3 to 4 times as long as the internodes. Pl. II, fig. 14. Guatemala to Colombia. 109. _V_. _gladioliflora_
        24. Leaves acute, not apiculate. Costa Rica.
          26. Floral bracts broadly acute, much exceeding the sepals. 110. _V_. _pachyspatha_
          26. Floral bracts obtuse, barely exceeding the sepals. 111. _V_. _macrantha_
    21. Floral bracts even or longitudinally striate, not rugose.
      27. Flowers reflexed at anthesis but the floral bracts often still imbricate. Pl. II, fig. 15. Mexico. 112. _V_. _ovandensis_
      27. Flowers not reflexed.

28. Floral bracts densely imbricate and concealing the rhachis.
29. Sepals 10-15 mm long; scapes very slender, numerous, lateral (cf. Tillandsia complanata).
29. Sepals 27-40 mm long; scapes rather stout, single, central.
30. Scape-bracts foliaceous; lowest floral bracts long-acuminate. Costa Rica.............113. V. acuminata
30. Scape-bracts bracteiform; none of the floral bracts acuminate (cf. Tillandsia fendleri, glossophylla, walteri).
28. Floral bracts inrolled about the sepals and exposing the rhachis or barely imbricate.
31. Sepals to 8.5 mm long; leaf-blades very narrowly linear, acuminate. Colombia.........114. V. schultesiana
31. Sepals 15-35 mm long; leaf-blades ligulate, acute to subobtuse and apiculate.
32. Sepals 15 mm long; floral bracts 22 mm long; leaves acute. Costa Rica..............115. V. brachyphylla
32. Sepals to 35 mm long; floral bracts 45-55 mm long; leaves broadly acute or subobtuse and apiculate.
33. Floral bracts even; sepals ovate-elliptic, broadly acute. Costa Rica..................116. V. brunei
33. Floral bracts strongly nerved; sepals oblong, rounded Brazil..........................42. V. pauciflora

SUBKEY VI

1. Flowers merely divergent at anthesis.
2. Sepals 8.5 mm long; leaf-blades narrowly linear, acuminate. Colombia..............................114. V. schultesiana
2. Sepals 16-42 mm long.
3. Scape-bracts all equaling or exceeding the internodes.
4. Sepals 22-28 mm long.
5. Floral bracts exceeding the sepals.
6. Sepals broadly ovate; floral bracts ecarinate. Pl. III, figs. 1, 2. Costa Rica...............117. V. apiculata
6. Sepals 8 mm wide; floral bracts carinate. Brazil. 43. V. biguassuensis
5. Floral bracts shorter than the sepals. Venezuela. 44. V. laxa
4. Sepals 35-40 mm long.
7. Floral bracts shorter than the sepals, ecarinate (cf. Tillandsia viridiflora).
7. Floral bracts about equaling the sepals or longer.
8. Floral bracts rugose, much exceeding the sepals. Costa Rica................................108. V. rugosa
8. Floral bracts faintly nerved, about equaling the sepals. Bolivia, Argentina.....................45. V. maxoniana
3. Scape-bracts shorter than the upper internodes; floral bracts much shorter than the sepals. Brazil.
9. Pedicels slender, 8 mm long; sepals subacute, 25-30 mm long

Pl. III, fig. 3........................46. *V. amethystina*

9. Pedicels very short or none; sepals 16-22 mm long.

10. Leaf-blades lance-triangular, almost the same length as the sheaths, 35 mm wide..............118. *V. lancifolia*

10. Leaf-blades linear, several times longer than the sheaths 13 mm wide............................119. *V. parviflora*

1. Flowers spreading to reflexed at anthesis.

11. Floral bracts with truncate bases, usually bright red or yellow, sometimes pale green.

12. Floral bracts from about the same length as the internodes to twice as long, from slightly shorter than the sepals to equaling them; rhachis slender, flexuous, its internodes more or less curved; inflorescence few-flowered. Brazil.

13. Sepals 35-40 mm long; floral bracts about twice as long as the internodes; scape-bracts all imbricate; stamens exserted. Pl. III, fig. 4.............47. *V. psittacina*

13. Sepals to 25 mm long; floral bracts about equaling the internodes; scape-bracts nearly all shorter than the internodes in this variety with a simple inflorescence; stamens included..........................28. *V. procera*

12. Floral bracts mostly 3 times as long as the internodes or more; rhachis stout, straight or geniculate with straight internodes; inflorescence usually many-flowered.

14. Floral bracts recurved toward the apex and with undulate margins, ample, to 55 mm long, enfolding and exceeding the sepals. Pl. III, fig. 5. Brazil....48. *V. recurvata*

14. Floral bracts straight or incurved toward apex.

15. Floral bracts sharply carinate, the keel incurved toward the apex, nerved; sepals 20-30 mm long.

16. Rhachis straight or nearly so; flowers sessile (cf. *Tillandsia dyeriana*).

16. Rhachis more or less geniculate; flowers on short stout pedicels. Pl. III, fig. 6. Brazil..49. *V. morreniana*

15. Floral bracts slightly if at all carinate, the keel nearly straight; sepals 30-40 mm long. Brazil.

17. Sepals exserted; floral bracts suborbicular, rather thin, only the lowest spreading and not imbricate.
29. *V. gradata*

17. Sepals included; floral bracts narrower, coriaceous, all spreading with age. Pl. III, fig. 7.
50. *V. ensiformis*

11. Floral bracts with decurrent auricles at base, usually dull green; stamens included so far as known.

18. Sepals 42-45 mm long.

19. Leaf-blades concolorous; floral bracts about equaling the sepals. Cuba, Puerto Rico, Venezuela.
120. *V. macrostachya*

19. Leaf-blades marked with spots or lines or both together; floral bracts much shorter than the sepals. Pl. III, figs. 8, 9. Brazil..................121. *V. fenestralis*

18. Sepals 17-33 mm long.

20. Floral bracts smooth and even when dry, coriaceous, not at all fleshy.
  21. Floral bracts dark castaneous with pale margins, from slightly shorter to slightly longer than the sepals. Brazil....................................122. V. atra
  21. Floral bracts wholly dull green or with dark margins.
    22. Sepals very broad, distinctly less than half exserted from the floral bracts if at all; plants robust.
      23. Scape-bracts imbricate; leaves concolorous or transversely marked with dark irregular green lines; flowers spreading at anthesis; sepals broadly ovate, acute or subacute. Pl. IV, fig. 1. Trinidad, Brazil 123. V. jonghei
      23. Scape-bracts shorter than the upper internodes; leaves transversely marked with purple lines; flowers reflexed at anthesis; sepals broadly elliptic, obtuse. Pl. IV, figs. 2, 3. Brazil........124. V. fosteriana
    22. Sepals narrowly elliptic or suboblong, much longer than broad, about half exserted; flowers usually reflexed at anthesis. Pl. IV, figs. 4, 5. West Indies, eastern South America...................125. V. platynema
20. Floral bracts becoming rugose or nerved when dry, fleshy or subchartaceous or subcoriaceous.
  24. Floral bracts fleshy, becoming rugose when dry; rhachis stout.
    25. Sepals acute, to 35 mm long; floral bracts obtusely carinate. Brazil......................126. V. wawranea
    25. Sepals subobtuse, 25-44 mm long; floral bracts convex, ecarinate.
      26. Inflorescence covered with a strongly glutinous material; floral bracts broadly ovate, imbricate before anthesis, usually with dark margins. Pl. IV, fig. 6. Venezuela, Brazil..................127. V. bituminosa
      26. Inflorescence dry; floral bracts elliptic, never imbricate, concolorous. Brazil.....128. V. regnellii
  24. Floral bracts becoming nerved when dry, subchartaceous or subcoriaceous.
    27. Sepals covered by the floral bracts; floral bracts about 4 times as long as the internodes. Pl. II, fig. 15. Mexico................................112. V. ovandensis
    27. Sepals exserted for about half their length beyond the floral bracts; floral bracts only about 2 times as long as the internodes.
      28. Scape-bracts densely imbricate; pedicels stout; sepals 25-35 mm long. Pl. IV, figs. 4, 5. West Indies, eastern South America...............125. V. platynema
      28. Scape-bracts slightly shorter than the upper internodes; pedicels rather slender; sepals to 22 mm long. Brazil..............................104. V. minarum

..................................................................

SUBKEY VII

1. Floral bracts densely verrucose. Costa Rica....129. _V_. _nutans_
1. Floral bracts even or nerved but not verrucose.
 2. Leaf-blades marked on the upper or both sides with dark spots, broadly rounded; floral bracts farinaceous, 30-40 mm long. Brazil.
  3. Floral bracts imbricate and concealing the rhachis, broader than long, equaling the sepals. Pl. IV, figs. 7, 8. 51. _V_. _pardalina_
  3. Floral bracts enfolding the spreading flowers and thus exposing the rhachis, broadly ovate, equaling or shorter than the sepals. Pl. IV, figs. 9, 10.......52. _V_. _guttata_
 2. Leaf-blades concolorous, pale green.
  4. Floral bracts imbricate and concealing the rhachis, exceeding the sepals.
   5. Scapes many, lateral; floral bracts 15-25 mm long (cf. _Tillandsia_ _complanata_).
   5. Scapes single, central; floral bracts 50-55 mm long. Brazil.........................................53. _V_. _obliqua_
  4. Floral bracts spreading and exposing the rhachis at anthesis
   6. Floral bracts laterally compressed, sharply carinate, incurved, to 40 mm long, slightly shorter than the sepals. Pl. IV, fig. 11. Brazil.......54. _V_. _retroflexa_
   6. Floral bracts not compressed, slightly if at all carinate, usually much shorter than the sepals; pedicels slender, 8-20 mm long.
    7. Floral bracts much more than half as wide as long, 35-45 mm long, their margins much overlapping behind the sepals. Pl. IV, fig. 12. Trinidad, Venezuela, Colombia, Brazil.........................................55. _V_. _simplex_
    7. Floral bracts not more than half as wide as long, not over 35 mm long, their margins overlapping little if at all. Pl. IV, figs. 13, 14. Brazil............56. _V_. _scalaris_

SUBKEY VIII

1. Floral bracts black from the first, fleshy; branches of the inflorescence with elongate sterile bases bearing many remote bracts (only very young material known so uncertain if flowers secund). Brazil.....................76. _V_. _funebris_
1. Floral bracts pale or at most dark castaneous, never black and fleshy.
 2. Scape-bracts shorter than the upper internodes (unknown in _V_. _tuerckheimii_).
  3. Inflorescence dense or subdense; branches erect or suberect; floral bracts mostly more than twice as long as the internodes; sepals 22-24 mm long. Brazil.
   4. Leaf-sheaths dark castaneous; scape-bracts half as long as the internodes...............................130. _V_. _crassa_
   4. Leaf-sheaths pale; scape-bracts only a little shorter than the internodes...........................131. _V_. _densiflora_

3. Inflorescence lax; branches more or less spreading.

5. Floral bracts imbricate; scape unknown (cf. *Tillandsia cucullata*).

5. Floral bracts less than twice as long as the internodes.

6. Sepals equaling the floral bracts, to 23 mm long. Cuba. 132. *V. dissitiflora*

6. Sepals exceeding the floral bracts.

7. Pedicels 1-2 cm long, exceeding the floral bracts, very slender; sepals 7-11 mm long. Costa Rica. 85. *V. pedicellata*

7. Pedicels shorter and stouter, much exceeded by the floral bracts.

8. Branches 20-flowered, to 55 cm long; sepals 15-20 mm long. Pl. IV, figs. 15-17. Hispaniola. 133. *V. tuerckheimii*

8. Branches 2-3-flowered, to 18 cm long with the sterile part much the longer.

9. Sterile bases of the branches bracteate; sepals 15 mm long. Brazil......................134. *V. sparsiflora*

9. Sterile bases of the branches naked; sepals 9 mm long. Costa Rica..........................135. *V. triflora*

2. Scape-bracts all imbricate (unknown in *V. tuerckheimii*).

10. Branches laxly flowered; floral bracts distinctly less than twice as long as the internodes.

11. Pedicels 1-2 cm long, equaling or exceeding the floral bracts. Costa Rica.

12. Floral bracts thick, coriaceous; pedicels stout, 1 cm long.................................136. *V. discolor*

12. Floral bracts membranaceous; pedicels very slender, 1-2 cm long...............................85. *V. pedicellata*

11. Pedicels shorter, always exceeded by the floral bracts.

13. Branches very slender, at most barely exceeding 2 mm in diameter; floral bracts mostly thin.

14. Leaf-blades narrowly triangular, 15 mm wide. Brazil. 12. *V. lubbersii*

14. Leaf-blades ligulate or linear.

15. Sterile bases of the branches much longer than the few-flowered fertile part; sepals narrowly oblong, obtuse. Jamaica......................137. *V. swartzii*

15. Sterile bases of the branches much shorter than the fertile part. Brazil.

16. Inflorescence few-branched; plant 35 cm high; sepals 23 mm long, about equaling the floral bracts. 57. *V. delicatula*

16. Inflorescence much branched; plant 6-30 dm high.

17. Sepals 13 mm long; branches 8-12 cm long; inflorescence narrow.........................22. *V. leptantha*

17. Sepals to 25 mm long; branches to 50 cm long, inflorescence ample.

18. Upper scape-bracts and lower primary bracts foliaceous; floral bracts broadly ovate, acute, much shorter than the sepals.

19. Leaf-blades 5-8 cm wide; plant lacking rhizomes. Pl. IV, fig. 18..........58. *V. philippocoburgii*

19. Leaf-blades 2-4 cm wide; plant bearing elongate rhizomes............................59. *V. vagans*

18. Upper scape-bracts and lower primary bracts lanceolate; floral bracts broadly elliptic, broadly acute or obtuse, slightly shorter than or equaling the sepals...........................28. *V. procera*

13. Branches stout, much more than 2 mm in diameter; floral bracts mostly coriaceous.

20. Floral bracts much shorter than the sepals.

21. Primary bracts exceeding the sterile bases of the branches; floral bracts 25-30 mm long. Jamaica. 223. *V. gibba*

21. Primary bracts much shorter than the sterile bases of the branches.

22. Floral bracts 20-25 mm long; sepals narrowly obovate, to 24 mm long (cf. *Tillandsia mima*).

22. Floral bracts 7-15 mm long; sepals elliptic, 15-20 mm long. Pl. IV, figs. 15-17. Hispaniola. 133. *V. tuerckheimii*

20. Floral bracts about equaling or exceeding the sepals.

23. Rhachis verrucose just below each node; floral bracts broadly ovate, acuminate. Pl. IV, fig. 19. Costa Rica to Colombia, West Indies.........138. *V. ringens*

23. Rhachis not at all verrucose.

24. Sepals acute. Brazil.

25. Primary bracts with distinct elongate blades; inflorescence much branched.

26. Floral bracts ovate, loosely and incompletely sheathing the base of the flower, becoming slightly if at all secund, sulcate when dry with a broad thin margin; sepals oblong, to 37 mm long, about 3 times as long as broad. Pl. I, fig. 25. 96. *V. gigantea*

26. Floral bracts suborbicular, tightly and completely sheathing the base of the flower, becoming secund, even; sepals lance-ovate, 30 mm long, about twice as long as broad...................139. *V. morrenii*

25. Primary bracts bladeless, inconspicuous; inflorescence few-branched; sepals 26 mm long. 140. *V. ruschii*

24. Sepals obtuse.

27. Floral bracts 32 mm long, about twice as long as the internodes; sepals elliptic. Brazil. 141. *V. hoehneana*

27. Floral bracts 25 mm long, about equaling the internodes; sepals broadly elliptic. Trinidad, Guiana, Amazonian Brazil..................142. *V. amazonica*

10. Branches densely flowered; floral bracts twice as long as the internodes or longer.

……

28. Floral bracts drying dark castaneous except for the apex or the margins. Brazil.

29. Sepals acute; floral bracts broadly ovate, acute, pale and slightly rugulose near the apex, 3-8 cm long, usually much exceeding the sepals...106. *V. longicaulis*

29. Sepals obtuse; floral bracts suborbicular with narrow pale margins, 2-3 cm long, usually shorter than the sepals. Pl. V, fig. 1.................143. *V. itatiaiae*

28. Floral bracts usually green or yellow, sometimes red or pale brown, but always pale on drying.

30. Floral bracts equaling or exceeding the sepals of at least the lowest flowers.

31. Sepals twice as long as wide or narrower; floral bracts narrowly obtuse to acuminate.

32. Rhachis verrucose below each node; floral bracts acuminate. Pl. IV, fig. 19. Costa Rica to Colombia, West Indies..................................138. *V. ringens*

32. Rhachis not at all verrucose; floral bracts acute or narrowly obtuse.

33. Floral bracts conduplicate, sharply carinate. Brazil. 24. *V. brusquensis*

33. Floral bracts broadly convex, weakly or not at all carinate (cf. *Tillandsia cucullata*, *secunda*).

31. Sepals but slightly longer than wide; floral bracts obtuse, dull.

34. Floral bracts convex, ecarinate, 22-30 mm long.

35. Spikes many with naked sterile bases. Costa Rica. 81. *V. camptoclada*

35. Spikes few with long many-bracted sterile bases. Pl. V, figs. 2, 3. Colombia.............144. *V. confusa*

34. Floral bracts carinate toward apex, 35-45 mm long. Salvador..........................145. *V. cornus-cervi*

30. Floral bracts always distinctly shorter than the sepals.

36. Flowers upwardly secund; branches spreading, many; sepals 35-40 mm long; petals flaccid. Brazil.

37. Rhachis strongly geniculate; only a few flowers secund. Pl. II, fig. 2.....................222. *V. brasiliana*

37. Rhachis merely flexuous, all of the flowers secund. Pl. V, figs. 4, 5..................224. *V. imperialis*

36. Flowers downwardly secund.

38. Leaves ornamented with dark purple irregular transverse bands; floral bracts broadly ovate, carinate; sepals narrowly elliptic, 25 mm long, much exserted. Pl. V, figs. 6, 7. Brazil..............146. *V. hieroglyphica*

38. Leaves without purple bands but sometimes with narrow dark green lines.

39. Sepals 20 mm long; branches 4-8-flowered, short, very slender. Brazil.

40. Floral bracts nearly equaling the sepals; branches with naked sterile bases. 147. *V. penduliflora*

40. Floral bracts only about half as long as the sepals;

branches with bracteate sterile bases.
148. _V_. _segadas-viannae_

39. Sepals much more than 20 mm long or the branches many-flowered and stout.
  41. Leaf-blades and lower scape-bracts acuminate or acute with a stiff involute-subulate terminal cusp.
    42. Sepals about equaling the 3 cm long floral bracts. Costa Rica.
      43. Floral bracts obtusely carinate, more or less secund with the flowers. Pl. V, fig. 8. Mexico, Guatemala also..................149. _V_. _werckleana_
      43. Floral bracts ecarinate, not at all secund.
150. _V_. _kupperiana_
    42. Sepals distinctly exceeding the floral bracts.
      44. Floral bracts abruptly acute, the keel evenly curved from base to apex. Pl. V, fig. 9. Costa Rica to Colombia, Greater Antilles.
151. _V_. _sanguinolenta_
      44. Floral bracts truncate, gibbous about one-third below the apex. Jamaica............223. _V_. _gibba_
  41. Leaf-blades and lower scape-bracts broadly acute or subrounded with a flat soft apiculus. Brazil.
    45. Inflorescence few-branched, the terminal branch with an elongate sterile base almost completely covered with bracts.
      46. Sepals to 35 mm long; floral bracts barely twice as long as the internodes; plant generally 2 m or taller.........................141. _V_. _hoehneana_
      46. Sepals 17-27 mm long; floral bracts from barely imbricate to 3.5 times the internodes; plant 6-12 dm tall.
        47. Leaf-blades glabrous above; floral bracts to 35 mm long, 2.5-3.5 times the internodes.
152. _V_. _longiscapa_
        47. Leaf-blades covered on both sides with appressed cretaceous brown-centered scales; floral bracts 10 mm long, scarcely more than twice the internodes..........................153. _V_. _cearensis_
    45. Inflorescence many-branched, the terminal branch not much different from the others.
      48. Floral bracts 3 to 4 times as long as the internodes, remaining imbricate, obtusely carinate; leaf-blades concolorous........154. _V_. _hydrophora_
      48. Floral bracts scarcely more than twice as long as the internodes, faintly or not at all carinate; leaf-blades marked with dark green cross-lines.
155. _V_. _pastuchoffiana_

## SUBKEY IX

1. Floral bracts acuminate, sharply carinate toward apex; rhachis verrucose below each node. Pl. IV, fig. 19. Costa Rica to

Colombia, West Indies........................138. V. ringens
1. Floral bracts acute or obtuse or if rarely the lowest acuminate then the rhachis not verrucose.
2. Inflorescence dense, the floral bracts at least twice as long as the internodes.
3. Scape-bracts shorter than the internodes.
4. Floral bracts acute, green; leaves acuminate. Guatemala. 156. V. pectinata
4. Floral bracts obtuse, castaneous; leaves broadly rounded or subtruncate. Brazil..................157. V. clausseniana
3. Scape-bracts all exceeding the internodes.
5. Floral bracts rugulose or verrucose throughout when dry.
6. Floral bracts abruptly contracted to a distinct triangular apex; sepals acute. Panama..........158. V. woodsoniana
6. Floral bracts without abrupt distinction between base and apex.
7. Leaf-blades broadly acute or rounded and apiculate.
8. Floral bracts becoming secund with the flowers; sepals twice as long as broad. British Guiana. 159. V. pachychlamys
8. Floral bracts remaining erect; sepals less than twice as long as broad. Pl. II, fig. 14. Guatemala to Colombia.........................109. V. gladioliflora
7. Leaf-blades acuminate; floral bracts slightly more than twice as long as the internodes.
9. Leaf-blades concolorous, green and obscurely lepidote on both sides; sepals 40 mm long; floral bracts rugulose, thick, coriaceous. Costa Rica......160. V. tonduziana
9. Leaf-blades pale and densely appressed-lepidote beneath; sepals not over 25 mm long; floral bracts rather thin, verrucose. Pl. V, figs. 10, 11. Mexico. 161. V. vanhyningii
5. Floral bracts even or nerved but neither rugulose nor verrucose except sometimes near their apices.
10. Floral bracts bicolorous, dark castaneous and coriaceous except for the pale soft apex, 3-8 cm long. Brazil. 106. V. longicaulis
10. Floral bracts uniform or nearly so.
11. Floral bracts remaining erect, not becoming secund with the flowers.
12. Floral bracts ecarinate.
13. Floral bracts green, about twice as long as the internodes. Brazil..................162. V. unilateralis
13. Floral bracts castaneous when dry, densely imbricate. Costa Rica.
14. Leaf-blades acuminate, concolorous, subglabrous. 114. V. acuminata
14. Leaf-blades subrounded and apiculate, densely white-lepidote beneath, subglabrous above. 163. V. bicolor
12. Floral bracts carinate at least toward the apex.

……

15. Leaf-blades acuminate; floral bracts up to 5 cm long, much exceeding the sepals. Lesser Antilles.
164. *V. guadelupensis*
15. Leaf-blades rounded and apiculate. Brazil.
16. Floral bracts greenish brown, obtusely carinate.
152. *V. longiscapa*
16. Floral bracts bright red except for the green apex and margins, sharply carinate.
60. *V. interrogatoria*
11. Floral bracts becoming secund with the flowers.
17. Rhachis subalate, up to 10 mm in diameter, dark, its internodes narrowly obconical; leaves mostly red-spotted; plant 1-2 m high. Pl. V, fig. 9. Costa Rica to Colombia, Greater Antilles.
151. *V. sanguinolenta*
17. Rhachis terete or angled with its internodes subcylindrical, rarely more than 5 mm in diameter.
18. Leaf-blades less than 2 cm wide, acuminate; plants not over 5 dm high; inflorescence few-flowered. Costa Rica, Panama.......................165. *V. subsecunda*
18. Leaf-blades 3-10 cm wide; plants 5-20 dm high; inflorescence usually many-flowered.
19. Floral bracts strikingly colored with contrasting margins.
20. Floral bracts bright red with green apex and margins Brazil.......................60. *V. interrogatoria*
20. Floral bracts drying dark castaneous with a narrow pale margin, even, lustrous, broadly convex.
21. Leaf-blades very obscurely punctulate-lepidote beneath; floral bracts broadly ovate. Costa Rica.
166. *V. pittieri*
21. Leaf-blades covered beneath with white scales; floral bracts broader than long. Costa Rica.
167. *V. ampla*
19. Floral bracts green, dull buff, or pale brown.
22. Floral bracts evenly convex without any keel.
23. Sepals 15-20 mm long; leaf-blades 2.5-4 cm wide.
24. Leaf-blades concolorous; floral bracts equaling the sepals. Pl. V, fig. 12. Central America, British Guiana, Venezuela, Colombia.
168. *V. viridiflora*
24. Leaf-blades marked with fine longitudinal red stripes; floral bracts much exceeded by the sepals. Pl. V, fig. 13. Costa Rica.
169. *V. marnier-lapostollei*
23. Sepals 35 mm long; leaf-blades 6 cm wide. Cuba.
170. *V. haplostachya*
22. Floral bracts carinate.
25. Leaf-blades acuminate. Mexico...171. *V. chiapensis*
25. Leaf-blades broadly acute or rounded and apiculate.
26. Sepals up to 34 mm long; floral bracts barely twice as long as the internodes; plant usually

2 m or higher. Brazil.........141. *V. hoehneana*

26. Sepals 20-27 mm long; floral bracts two and a half to three times as long as the internodes; plant 6-12 dm high. Brazil.........152. *V. longiscapa*

2. Inflorescence lax, the floral bracts distinctly less than twice as long as the internodes.

27. Leaf-blades linear, 4 dm long and not over 5 mm wide; inflorescence typically 3-flowered; floral bracts membranaceous. Costa Rica...........172. *V. graminifolia*

27. Leaf-blades narrowly triangular or ligulate, 15-80 mm wide; inflorescence normally much more than 3-flowered; floral bracts firmer.

28. Scape-bracts, or at least the upper ones, shorter than the internodes; sepals much exceeding the floral bracts.

29. Leaf-blades narrowly triangular, acuminate; floral bracts obtuse, ecarinate.

30. Floral bracts and sepals thick, coriaceous. Brazil. 173. *V. brassicoides*

30. Floral bracts and sepals thin, chartaceous. Venezuela.............................174. *V. fibrosa*

29. Leaf-blades ligulate, acute or broadly rounded and apiculate; floral bracts acute.

31. Floral bracts ecarinate; sepals suboblong, to 40 mm long. Colombia.......................175. *V. socialis*

31. Floral bracts carinate; sepals elliptic, 25-28 mm long. Brazil............................176. *V. platzmannii*

28. Scape-bracts all imbricate.

32. Floral bracts exceeding the sepals.

33. Rhachis verrucose below each node; floral bracts rugulose; leaf-blades concolorous, green, 20 mm wide. Colombia............................177. *V. verrucosa*

33. Rhachis not verrucose; floral bracts even; leaf-blades banded or spotted, 30-35 mm wide.

34. Floral bracts acute or acuminate; sepals 17 mm long. British Honduras.....................178. *V. schippii*

34. Floral bracts obtuse; sepals 26 mm long. Costa Rica. 179. *V. macrochlamys*

32. Floral bracts distinctly exceeded by the sepals.

35. Leaf-blades narrowly triangular, long-acuminate, not over 3 cm wide.

36. Floral bracts fleshy-coriaceous, coarsely lepidote except in age; flowers divergent; sepals oblong, 27-30 mm long. Brazil....................180. *V. oligantha*

36. Floral bracts subchartaceous, sparsely and minutely lepidote; flowers spreading; sepals broadly elliptic, 18 mm long. Pl. V, figs. 14, 15. Trinidad. 181. *V. broadwayi*

35. Leaf-blades ligulate, acute or rounded and apiculate or sometimes the apex acuminate for a short distance, 15-80 mm wide.

37. Plants less than 1 m high; scape slender; floral bracts ecarinate.

38. Floral bracts little more than once as long as the internodes; leaf-blades densely maroon-spotted. Pl. V, figs. 16, 17. Brazil.............182. V. racinae

38. Floral bracts nearly twice as long as the internodes; leaf-blades concolorous.

39. Leaf-blades broadly rounded and apiculate; floral bracts remaining erect or nearly so. Brazil. 162. V. unilateralis

39. Leaf-blades acuminate; floral bracts becoming secund with the flowers. Colombia.......183. V. vexillata

37. Plants 1-2 m high or more; scape stout; floral bracts obtusely carinate toward apex.

40. Sepals narrowly elliptic; floral bracts about twice as long as the internodes. Brazil....141. V. hoehneana

40. Sepals very broadly elliptic; floral bracts about as long as the internodes. Trinidad, Guiana, Brazil. 142. V. amazonica

SUBKEY X

1. Branches of the inflorescence well developed, at least below the flowers.

2. Flowers subsessile (pedicels at most 4 mm long and very stout).

3. Rhachis well developed, the flowers racemose.

4. Primary bracts covering the branches (cf. Tillandsia biflora, stipitata).

4. Primary bracts much shorter than the branches, or if longer than the lowest ones (V. splitgerberi) then narrow and spreading and not covering them.

5. Flowers erect, densely imbricate, numerous. Pl. V, figs. 18, 19. Costa Rica, Trinidad, Guiana, Venezuela, Colombia............................184. V. splitgerberi

5. Flowers divergent to spreading, lax.

6. Floral bracts 30 mm long, exceeding the sepals. Brazil. 61. V. corcovadensis

6. Floral bracts 4 mm long, much shorter than the sepals. Costa Rica.............................185. V. diffusa

3. Rhachis aborted, the flowers corymbose.

7. Branches short, the lower ones 10-15-flowered. Pl. V, fig. 20. West Indies, Venezuela, Colombia, Ecuador. 186. V. capituligera

7. Branches elongate, the lower ones 2-flowered. Costa Rica. 187. V. crassiflora

2. Flowers distinctly pedicellate. Costa Rica.

8. Pedicels 11 mm long........................99. V. turbinata

8. Pedicels 5-6 mm long.

9. Pedicels slender.

10. Sepals symmetrical, narrowly obovate, broadly rounded, 14 mm long............................188. V. cylindracea

10. Sepals strongly asymmetric, slightly emarginate, 10 mm long (undeveloped)....................189. V. leptopoda

9. Pedicels very stout; leaves green tinged with violet beneath..................................98. *V. latissima*

1. Branches of the inflorescence very short or aborted with the flowers fascicled in the axils of the primary bracts, or else the perfect flowers solitary on each branch (the genus *Thecophyllum* as used largely by Mez).

11. Flowers 3 or more in the axil of at least each lower primary bract.

12. Floral bracts exceeding the sepals; leaves concolorous. Costa Rica..............................190. *V. bracteosa*

12. Floral bracts much shorter than the sepals; leaves cross-barred.

13. Primary bracts large, imbricate; floral bracts broadly reniform. Costa Rica................191. *V. nephrolepis*

13. Primary bracts small, remote; floral bracts suborbicular. Guatemala, Honduras......................192. *V. montana*

11. Flowers 1 or 2 in the axil of each primary bract.

14. Perfect flowers 2 in the axil of each primary bract.

15. Pedicels slender, 1-2 cm long. Costa Rica. 193. *V. violascens*

15. Pedicels stout and short or lacking.

16. Floral bracts exceeding the sepals.

17. Blades of the leaves and scape-bracts covered with pale appressed scales. Costa Rica.

18. Inflorescence cylindric, fertile throughout.

19. Leaf-blades narrowly triangular, attenuate, 25 mm wide; primary bracts spreading...194. *V. leucophylla*

19. Leaf-blades ligulate, abruptly acute, 35 mm wide; primary bracts erect............195. *V. spectabilis*

18. Inflorescence cyathiform with a coma of sterile bracts at apex.............................196. *V. comata*

17. Blades of the leaves and scape-bracts glabrous or subglabrous.

20. Sepals 7-8 mm long.

21. Primary bracts erect; leaf-blades acute, 30-40 mm wide. Lesser Antilles.............197. *V. antillana*

21. Primary bracts decurved toward apex; leaf-blades acuminate, 25 mm wide. Trinidad, Venezuela (Isla Margarita)..........................198. *V. johnstonii*

20. Sepals 10-15 mm long.

22. Leaf-blades marked throughout with fine irregular cross-bands; inflorescence densely capitate or short-cylindric. Costa Rica.........199. *V. notata*

22. Leaf-blades concolorous or slightly marked at base.

23. Leaf-blades ligulate, acute to rounded and apiculate; inflorescence dense; sepals 15-17 mm long.

24. Sepals suborbicular. Costa Rica...190. *V. bracteosa*

24. Sepals elliptic. Colombia......200. *V. hygrometrica*

23. Leaf-blades acuminate; inflorescence lax at least toward base. Ecuador..............201. *V. paupera*

16. Floral bracts shorter than the sepals.

25. Leaves with fine wavy cross-lines.

26. Floral bracts ovate, acute; primary bracts suberect; leaf-blades acuminate, 40 mm wide; sepals 16 mm long. Costa Rica..............................202. *V*. *picta*

26. Floral bracts suborbicular to reniform, rounded or truncate; primary bracts spreading to reflexed.

27. Leaf-blades acuminate, 20 mm wide; sepals 8 mm long, slightly asymmetric. Costa Rica.....203. *V*. *lineata*

27. Leaf-blades acute, 30-70 mm wide; sepals 11-20 mm long

28. Scape erect; sepals broadly elliptic, 12-20 mm long.

29. Inflorescence few-flowered, subdense, 5 cm long; sepals 12-15 mm long. Guatemala, Honduras. 192. *V*. *montana*

29. Inflorescence many-flowered, slenderly cylindric, 15-30 cm long; sepals 20 mm long. Costa Rica. 204. *V*. *irazuensis*

28. Scape decurved; sepals broadly obovate, 20 mm long. Costa Rica......................205. *V*. *ororiensis*

25. Leaves unmarked or sometimes with straight longitudinal stripes.

30. Inflorescence capitate or short-cylindric, not over 5 cm long. Costa Rica.

31. Pedicels 8 mm long, stout; leaf-blades 4-5 cm wide. 206. *V*. *capitata*

31. Pedicels lacking; leaf-blades 6-15 mm wide.

32. Floral bracts broadly elliptic, to 12 mm long. 207. *V*. *attenuata*

32. Floral bracts squamiform, 2.5 mm long. 208. *V*. *stenophylla*

30. Inflorescence cylindric, 7-27 cm long.

33. Leaf-blades and scape-bracts acuminate, pale-lepidote; primary bracts reflexed. Costa Rica.

34. Sepals 9 mm long, orbicular.......209. *V*. *balanophora*

34. Sepals 11-17 mm long, suborbicular or obovate.

35. Inflorescence many-flowered, dense, 22-27 cm long; floral bracts 8 mm long; sepals 17 mm long. 210. *V*. *viridis*

35. Inflorescence few-flowered, very lax, 7 cm long; floral bracts 16 mm long; sepals 20 mm long. 211. *V*. *hainesiorum*

33. Leaf-blades (unknown in V. spectabilis) and scape-bracts acute or rounded and apiculate.

36. Primary and scape-bracts marked with fine purple longitudinal stripes like the leaves. Costa Rica. 212. *V*. *williamsii*

36. Primary and scape-bracts unmarked.

37. Primary bracts erect or nearly so, not recurving toward apex. Costa Rica.......195. *V*. *spectabilis*

37. Primary bracts spreading to recurved, at least toward apex.

38. Primary bracts densely pale-lepidote. Costa Rica.

39. Floral bracts acute, 12 mm long. 213. *V*. *standleyi*

39. Floral bracts rounded, 3-8 mm long.
188. V. cylindracea

38. Primary bracts glabrous and even or verrucose.

40. Inflorescence erect; sepals obovate or narrowly elliptic, twice as long as wide. Puerto Rico.
214. V. sintenisii

40. Inflorescence pendulous; sepals very broadly obovate. Costa Rica..........205. V. ororiensis

14. Perfect flowers single in the axil of each primary bract, but the presence of a floral bract indicating a compound inflorescence. Costa Rica

41. Flowers (branches) secund.............215. V. singuliflora

41. Flowers (branches) remaining polystichous..216. V. vittata

### SUBKEY XI

1. Inflorescence polystichous-flowered only at base, lax, elongate. Cuba (variety).......................125. V. platynema

1. Inflorescence wholly polystichous-flowered.

2. Leaf-blades ligulate, acute, 4-5 cm wide. Pl. VI, figs. 1, 2. Mexico................................217. V. malzinei

2. Leaf-blades narrowly triangular, acuminate. Brazil.

3. Scape-bracts all bearing recurved elongate blades; inflorescence dense, few-flowered, 4-9 cm long....62. V. poenulata

3. Scape-bracts bearing erect blades, those of the upper ones very short.

4. Inflorescence dense except at base; flowers in about 4 ranks, mostly suberect; floral bracts inflated. Pl. VI, figs. 3, 4................................63. V. flammea

4. Inflorescence lax; flowers in slightly more than 2 ranks, all divergent or spreading at anthesis; floral bracts closely enfolding the sepals.........61. V. corcovadensis

### Subgenus VRIESEA
### Section VRIESEA

1. V. HITCHCOCKIANA (L. B. Smith) L. B. Smith, Contr. U. S. Nat. Herb. 29:446. 1951. Tillandsia hitchcockiana L. B. Smith, Contr. Gray Herb. 89:10, pl. 4, figs. 2-5. 1930. Ecuador, Peru.

2. V. RAUHII L. B. Smith, Phytologia 6:194, pl. 1, figs. 5, 6. 1958. Stamens probably exserted. Pl. I, fig. 1: Spike x 1/4. Peru.

3. V. CEREICOLA (Mez) L. B. Smith, Phytologia 6:194. 1958; 8: 504. 1963. Tillandsia cereicola Mez, Fedde Rep. Nov. Spec. 3:34. 1906. Vriesea lopezii L. B. Smith, PHytologia 4:218, pl. 2, figs. 8-10. 1953. Peru.

4. V. ROBUSTA (Griseb.) L. B. Smith, Phytologia 7:4. 1959. Tillandsia robusta Griseb. Nachr. Ges. Wiss. Goett. 1864:15. 1865. Vriesea chlorantha L. B. Smith, Phytologia 5:286, pl. 2, figs. 9-12. 1955. Stamens (immature ?) about equaling the petals. Venezuela, Colombia.

..................................................................

5. V. OLMOSANA L. B. Smith, sp. nov. A V. cereicola (Mez) L. B. Smith, cui valde affinis, bracteis florigeris carinatis differt.

PLANT stemless, flowering to 6 dm long with the inflorescence extended. LEAVES numerous, 5-6 dm long, completely covered with fine appressed cinereous scales; sheaths suborbicular, scarcely distinct from the blades, 45 mm wide, ferruginous; blades very narrowly triangular, 35 mm wide at base. SCAPE decurved, slender, glabrous; scape-bracts densely imbricate and completely covering the scape, subfoliaceous with long linear blades. INFLORESCENCE densely bipinnate, 37 cm long; primary bracts broadly ovate, barely exceeding the sterile bracteate bases of the branches, subdensely and obscurely lepidote; spikes erect or suberect, the lateral to 14 cm long, the terminal to 18 cm including the sterile base, linear-lanceolate, acute, strongly complanate, 10-12-flowered, dense, glabrous; rhachis alate; floral bracts lanceolate, acute, carinate, 25 mm long, about equaling the sepals, subcoriaceous, nerved and reddish toward apex, yellowish green below; pedicels obscure. SEPALS free, lanceolate, broadly acute and apiculate, 23 mm long, ecarinate, subcoriaceous; petals linear, 35 mm long, bearing 2 large linear-lanceolate acute scales at base, the blades deep blue-violet with a narrow white margin; stamens exserted. Pl. I, fig. 2: Leaf x 1/4; fig. 3: Spike x 1/4; fig. 4: Sepal x 1.

PERU: Lambayeque or Cajamarca (?): Valley of Olmos, alt. 1000 m, 1956, flowered in Heidelburg in 1964, W. Rauh P-333 (US, type)

6. V. CYLINDRICA L. B. Smith, Contr. U. S. Nat. Herb. 29:445, fig. 46. 1951. Pl. I, fig. 7: Spike x 1/4. Colombia, Ecuador.

7. V. HARMSIANA (L. B. Smith) L. B. Smith, Contr. U. S. Nat. Herb. 29:447. 1951. Tillandsia harmsiana L. B. Smith, Contr. Gray Herb. 98:16, pl. 4, figs. 12-15. 1932. Pl. I, fig. 8: Spike x 1/4. Peru.

8. V. TILLANDSIOIDES L. B. Smith, Phytologia 9:256, pl. 4, figs. 6, 7. 1963. Pl. I, fig. 9: Spike x 1/4. Peru.

9. V. ARPOCALYX (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:445. 1951. Tillandsia arpocalyx André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. 60:567. Dec. 16, 1888. Ecuador.

10. V. TEQUENDAMAE (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:444. 1951. Tillandsia tequendamae André, Énum. Bromél. 8. Dec. 13, 1888; Rev. Hort. 60:568. Dec. 16, 1888. Venezuela to Peru.

11. V. PEREZIANA (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:444. 1951. Tillandsia pereziana André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. 60:567. Dec. 16, 1888. Colombia.

12. V. LUBBERSII (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:533, pl. 99. 1894. Tillandsia lubbersii Baker, Handb. Bromel. 219. 1889. Pl. I, fig. 10: Spike x 1/4. Brazil.

13. V. TRIANGULARIS Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:15, pl. 4. 1952. Brazil.

14. V. BARCLAYANA (Baker) L. B. Smith, Contr. U. S. Nat. Herb. 29:517, fig. 75. 1951. Tillandsia barclayana Baker, Journ. Bot. 25:239. 1887. T. lateritia André, Énum. Bromél. 6. Dec. 13,

1888; Rev. Hort. 60:566. Dec. 16, 1888. Ecuador.

15. V. PATULA (Mez) L. B. Smith, Phytologia 5:288. 1955. Tillandsia patula Mez, Fedde Rep. Nov. Spec. 3:35. 1906. Ecuador, Peru.

16. V. GRAVISIANA Wittm. Gartenfl. 39:494, figs. 81, 82. 1890. V. lubbersiana hort. ex Wittm. loc. cit., not E. Morr. Pl. I, fig. 12: Terminal spike x 1/6. Brazil.

17. V. SINCORANA Mez, Fedde Rep. Spec. Nov. 12:418. 1913. Brazil.

18. V. SCHWACKEANA Mez in DC. Mon. Phan. 9:590. 1896. Pl. I, fig. 16: Spike x 1/5. Brazil.

19. V. PINOTTII Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:12, pl. 3. 1952. Brazil.

20. V. FRIBURGENSIS Mez in Mart. Fl. Bras. 3, pt.3;537. 1894.

Var. a. FRIBURGENSIS. Vriesea tweedieana sensu F. Mueller, Gartenfl. 42:738. 1893, in part. Inflorescence distinctly longer than broad; branches erect or suberect; floral bracts all ecarinate, to 35 mm long; flowers all spreading. Pl. I, fig. 17: Spike x 1/4. Brazil.

Var. b. PALUDOSA (L. B. Smith) L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 4:68. 1952. Vriesea paludosa L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:119, pl. 128. 1943. V. saundersii sensu L. B. Smith, Anais Bot. Herb. Barbosa Rodrigues 2:26, 54. 1950, not E. Morr. Upper floral bracts carinate, about 25 mm long; upper flowers often imbricate. Brazil.

Var. c. TUCUMANENSIS (Mez) L. B. Smith, Anais B ot. Herb. Barbosa Rodrigues 4:68. 1952. Vriesea tucumanensis Mez in DC. Mon. Phan. 9:585. 1896. V. caldasiana Mez, op. cit. 607. V. argentinensis Spegazzini, Physis 3:158. 1917. V. glutinosa Wawra var. viridis Hassler, Ann. Conserv. & Jard. Bot. Genève 20:319. 1919. Branches spreading to arching-recurved, lax, flowers spreading. Brazil, Paraguay, Argentina.

21. V. BILLBERGIOIDES E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:534, pl. 100. 1894. Brazil.

Var. a. BILLBERGIOIDES. Scape-bracts imbricate; inflorescence bipinnate.

Var. b. SUBNUDA L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 10:147. 1951. Scape-bracts lax.

Var. c. AMPLA L. B. Smith, Arquiv. Jard. Bot. Rio de Janeiro 15:330, fig. r. 1958. Inflorescence amply tripinnate.

22. V. LEPTANTHA Harms, Notizblatt 12:532. 1935. Brazil.

23. V. RODIGASIANA E. Morr. Ill. Hort. 29:171, pl. 467. 1882. Tillandsia rodigasiana Baker, Journ. Bot. 26:138. 1888. T. tweedieana Baker, loc. cit. T. citrina Baker, Handb. Bromel. 224. 1889. Vriesea citrina E. Morr. ex Baker, loc. cit. nomen. V. tweedieana F. Mueller, Gartenfl. 42:738. 1893; Mez in Mart. Fl. Bras. 3, pt. 3:561. 1894, as to basonym. V. vitellina F. Mueller, loc. cit. Pl. I, fig. 18. Spike x 1/4. Brazil.

24. V. BRUSQUENSIS Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:10, pl. 2. 1952. Brazil.

25. V. NEOGLUTINOSA Mez, Engl. Pflanzenreich IV. 32:636. 1935. Tillandsia glutinosa Mart. ex Schult. in R. & S. Syst. 7:1225.

1830. Vriesea glutinosa Wawra, It. Sax.-Cob. 167. 1883, not Lindl. 1856. Brazil.

26. V. MUELLERI Mez, Bot. Jahrb. 30, Beibl. 67:7. 1901. Brazil.

27. V. SAUNDERSII (Carr.) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:540. 1894. Enchlorion saundersii Carr. Rev. Hort. 44: 300. 1872. Tillandsia saundersii K. Koch, Ind. Sem. Hort. Berol. 1873, App. 4:6. 1874. Vriesea botafogensis Mez in Mart. Fl. Bras. 3, pt. 3:536. 1894. Pl. I, figs. 20: Leaf x 1/3; fig. 21: Spike x 1/3. Brazil.

28. V. PROCERA (Mart. ex Schult.) Wittm. Bot. Jahrb. 13, Beibl. 29:21. 1891.

Var. a. PROCERA. Tillandsia procera Mart. ex Schult. in R. & S. Syst. 7:1224. 1830. Vriesea gracilis Gaud. Atl. Voy. Bonite pl. 67. 1843. Tillandsia gracilis Griseb. Nachr. Ges. Wiss. Goett. 1864:17. 1865. T. erectiflora Baker, Journ. Bot. 25:346. 1887. Vriesea catharinensis F. Mueller, Gartenfl. 42:738. 1893. V. procera var. gracilis Mez in Mart. Fl. Bras. 3, pt. 3:540. 1894. Tillandsia viscidula Britton, Bull. Torrey Club 48: 328. 1922. Scape-bracts imbricate; inflorescence amply paniculate; branches divergent to spreading, not twisted; floral bracts even, subcoriaceous, equaling the sepals or slightly shorter, green. Pl. I, fig. 22: Spike x 1/4. Trinidad, Guiana, Brazil.

Var. b. RUBRA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 2:197. 1952. Bracts red with yellow apices. Brazil.

Var. c. TENUIS L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:121. 1943. Tillandsia gracilis Ule, Bericht. Deutsch. Bot. Gesellsch. 18:325, pl. 10, figs. 7-11. 1900. T. ernestii Mez, Engl. Pflanzenreich IV. 32:636. 1935. Branches spreading to recurving, often twisted so that the flowers are secund; floral bracts membranaceous, nerved, much shorter than the sepals. Brazil.

Var. d. DEBILIS Mez in Mart. Fl. Bras. 3, pt. 3:540. 1894. Scape-bracts nearly all shorter than the internodes; inflorescence simple or subsimple; some of the floral bracts incurved. Brazil.

29. V. GRADATA (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:523. 1894. Tillandsia gradata Baker, Journ. Bot. 26:105. 1888. Brazil.

30. V. MODESTA Mez, Bot. Jahrb. 30, Beibl. 67:7. 1901. Brazil

31. V. ERYTHRODACTYLON E. Morr. ex Mez in DC. Mon. Phan. 9: 569. 1896. Vriesea psittacina var. erythrodactylon E. Morr. Belg. Hort. 32:287. 1882. Tillandsia carinata sensu Baker, Handb. Bromel. 212. 1889, in part, not as to type. Vriesea duvaliana sensu Wittm. Bot. Jahrb. 13, Beibl. 29:21. 1891, not E. Morr. V. carinata sensu Mez in Mart. Fl. Bras. 3, pt. 3:518. 1894, in part, not as to type. Pl. II, fig. 3: Spike x 1/4. Brazil.

32. V. BARILLETII E. Morr. Belg. Hort. 33:33, pl. 3. 1883; L. B. Smith, Phytologia 8:507. 1963. Vriesea eumorpha hort. ex Carr. Rev. Hort. 55:394. 1883, nomen. Tillandsia barilletii Baker, Journ. Bot. 26:79. 1888. Vriesea crotalophora hort. ex

Baker, Handb. Bromel. 215. 1889, nomen. Pl. II, fig. 5: Spike x 1/4. Brazil.

33. V. VULPINOIDEA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:122, pl. 134. 1943. Brazil.

34. V. INCURVATA Gaud. Atl. Voy. Bonite pl. 68. 1843. Vriesea psittacina var. truffautiana André, Journ. Soc. Hort. France III. 3:89. 1881. V. inflata sensu André, Rev. Hort. 59:44. 1887, as Tillandsia, not Wawra. Tillandsia incurvata Baker, Journ. Bot. 26:49. 1888, not C. Wright, 1871. Vriesea truffautiana hort. ex Baker, Handb. Bromel. 213. 1889, nomen. Vriesea rostrum-aquilae Mez in Mart. Fl. Bras. 3, pt. 3:518, pl. 107. 1894. V. duvaliana sensu Alexander, Addisonia 19:47, pl. 632. 1936, not E. Morr. Pl. II, fig. 6: Spike x 1/4. Brazil.

35. V. INFLATA (Wawra) Wawra, It. Sax.-Cob. 161. 1883. Vriesea carinata var. inflata Wawra, Oesterr. Bot. Zeitschr. 30:183. 1880. Tillandsia inflata Baker, Bot. Mag. pl. 6882. 1886, as to basonym. Vriesea incurvata var. inflata Mez in Mart. Fl. Bras. 3, pt. 3:522. 1894. Pl. II, fig. 7: Spike x 1/4. Brazil.

36. V. PETROPOLITANA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:120, pl. 130. 1943. Vriesea incurvata sensu E. Morr. Belg. Hort. 32:52, pl. 2. 1882, not Gaud. 1846. Tillandsia inflata Baker, Bot. Mag. pl. 6882. 1886, as to material and plate but not as to basonym of Wawra. Pl. II, fig. 8: Spike x 1/4. Brazil.

37. V. SPLENDENS (Brongn.) Lem. Fl. Serres 6, Misc.:162, fig. 1850-51.

Var. a. SPLENDENS. Tillandsia splendens Brongn. Ann. Fl. Pomone 18:311. 1845. Vriesea speciosa Hook. Bot. Mag. 74:pl. 4382. 1848. Tillandsia vittata Rich. ex Baker, Handb. Bromel. 215. 1889, nomen. T. picta hort. ex Baker, loc. cit., nomen. T. zebrina hort. ex Baker, loc. cit., nomen, not op. cit. 17. Leaf-blades with broad irregular cross-bands. Pl. II, fig. 9: Leaf-blade x 1/4; fig. 10: Spike x 1/4. Guiana, Venezuela.

Var. b. LONGIBRACTEATA (Baker) L. B. Smith, Smithsonian Misc. Coll. 126:36. 1955. Tillandsia longibracteata Baker, Journ. Bot. 26:81. 1888. Vriesea splendens var. formosa Witte, Semperv. 18: 361. 1889. Tillandsia splendens var. formosa Suringar ex Witte, loc. cit., nomen. Tillandsia appuniana Baker, Handb. Bromel. 213. 1889. Vriesea longibracteata Mez in DC. Mon. Phan. 9:568. 1896. V. splendens major hort. Duval, Rev. Hort. 69:307. 1897, nomen. V. longibracteata wartelii hort. Rev. Hort. 70:246. 1898, nomen. Leaf-blades concolorous. Trinidad, Guiana, Venezuela.

38. V. CARINATA Wawra, Oesterr. Bot. Zeitschr. 12:349. 1862. Vriesea brachystachys Regel, Gartenfl. 15:258, pl. 518. 1866. V. psittacina var. brachystachys E. Morr. Belg. Hort. 20:161. 1870. V. psittacina var. carinata E. Morr. Belg. Hort. 32:287, pls. 10-12, fig. 1. 1882. Tillandsia carinata Baker, Journ. Bot. 26: 49. 1888. T. psittacina sensu E. Morton, Brazil Fl. 2:pl. 43. 1893. Pl. II, fig. 11: Spike x 1/4. Brazil.

39. V. DUVALIANA E. Morr. Belg. Hort. 34:105, pls. 7, 8. 1884. Vriesea psittacina var. duvaliana André, Rev. Hort. 56:559. 1884. Tillandsia duvaliana Baker, Journ. Bot. 26:48. 1888. Pl. II,

fig. 12: Spike x 1/4. Brazil.

40. V. PARAIBICA Wawra, It. Sax.-Cob. 160, pl. 33, fig. B, pl. 36, fig. B. 1883. *Vriesea carinata* var. *constricta* Wawra, Oesterr. Bot. Zeitschr. 30:183. 1880. *Tillandsia paraibica* Baker, Journ. Bot. 26:82. 1888, as "parabaica". *T. carinata* var. *constricta* Baker, Handb. Bromel. 212. 1889. *Vriesea squamosa* E. Morr. ex Baker, loc. cit., nomen. Pl. II, fig. 13: Spike x 1/4. Brazil.

41. V. RHODOSTACHYS L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:121, pl. 132. 1943. Brazil.

42. V. PAUCIFLORA Mez, Fedde Rep. Spec. Nov. 16:72. 1919. Brazil.

43. V. BIGUASSUENSIS Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:8, pl. 1. 1952. Brazil.

44. V. LAXA Mez in DC. Mon. Phan. 9:578. 1896, emend. L. B. Smith, Phytologia 7:4. 1959. *Tillandsia laxa* Griseb. Nachr. Ges. Wiss. Goett. 1864:18. 1865, not Griseb. Fl. Brit. W. Ind. 596. 1864. Venezuela.

45. V. MAXONIANA (L. B. Smith) L. B. Smith, Phytologia 6:441. 1959. *Tillandsia maxoniana* L. B. Smith, Contr. Gray Herb. 124: 11, pl. 2, figs. 1-3. 1939. *Vriesea icterica* Castellanos, Lilloa 11:150. 1945; Gen. & Sp. Pl. Argent. 3:249, pl. 70. 1945. Bolivia, Argentina.

46. V. AMETHYSTINA E. Morr. Belg. Hort. 34:330, pls. 15, 16. 1884. *Tillandsia amethystina* Baker, Journ. Bot. 26:104. 1888. Pl. III, fig. 3: Spike x 1/4. Brazil.

47. V. PSITTACINA (Hook.) Lindl. Bot. Reg. 29:pl. 10. 1843.

Var. a. PSITTACINA. *Tillandsia psittacina* Hook. Bot. Mag. 55: pl. 2841. 1828. Floral bracts red with yellowish apices, ecarinate. Pl. III, fig. 4: Spike x 1/4. Brazil.

Var. b. RUBRO-BRACTEATA Hook. Bot. Mag. 85:pl. 5108. 1859. *Vriesea psittacina* var. *bracteis omnino coccineis* E. Morr. Belg. Hort. 32:287. 1882. *V. krameri* E. Morr. op. cit. 34:369. 1884. Floral bracts wholly red. Brazil (?).

Var. c. DECOLOR Wawra, Oesterr. Bot. Zeitschr. 30:183. 1880. Floral bracts wholly green, some of them more or less carinate. Brazil, Paraguay.

48. V. RECURVATA Gaud. Atl. Voy. Bonite pl. 69. 1843. *Tillandsia recurvata* Baker, Journ. Bot. 26:106. 1888, not L. 1762. *T. decurvata* Baker, Handb. Bromel. 216. 1889. Pl. III, fig. 5: Spike x 1/4. Brazil.

49. V. MORRENIANA hort. ex E. Morr. Belg. Hort. 32:289. 1882. *Vriesea psittacina* x *brachystachys* E. Morr. Belg. Hort. 29:300. 1879. *V. psittacina* var. *morreniana* E. Morr. Belg. Hort. 32:287, pls. 10-12, fig. 3. 1882. *V. carinata* x *psittacina* Mez in Mart. Fl. Bras. 3, pt. 3:528. 1894. Pl. III, fig. 6: Spike x 1/4. Brazil.

50. V. ENSIFORMIS (Vell.) Beer, Bromel. 92. 1857. Brazil.

Var. a. ENSIFORMIS. *Tillandsia ensiformis* Vell. Fl. Flum. 133. 1825; Icon. 3:pl. 129. 1835. *Vriesea conferta* Gaud. Atl. Voy. Bonite pl. 65. 1843. *V. conferta* var. *recurvata* Wawra, Oesterr. Bot. Zeitschr. 30:184. 1880, in part as to Wawra collections. Tillandsia selloana Baker, Journ. Bot. 26:104. 1888. T. heterostachys Baker, op. cit. 106. T. crousseana hort. Makoy, Rev. Hort. 60:203. 1890. Vriesea crousseana Rev. Hort. Belg. 19: 258. 1893. V. selloana Mez in Mart. Fl. Bras. 3, pt. 3:547. 1894. Leaf-blades concolorous; floral bracts coriaceous throughout, bright red. Pl. III, fig. 7: Spike x 1/4.

Var. b. STRIATA Alvim Seidel, Brom. Soc. Bull. 13:89, fig. 1963. Leaf-blades striped with creamy yellow.

Var. c. WARMINGII (E. Morr.) L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:116. 1943. Vriesea warmingii E. Morr. Belg. Hort. 34:260, pls. 12, 13. 1884. Tillandsia warmingii Baker, Journ. Bot. 26:104. 1888.

Var. d. BICOLOR L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:116. 1943.

51. V. PARDALINA Mez in Mart. Fl. Bras. 3, pt. 3:523. 1894. Tillandsia guttata Baker, Journ. Bot. 26:108. 1888, in part, not as to type. Pl. IV, fig. 7: Leaf-apex x 1/4; fig. 8: Spike x 1/4. Brazil.

52. V. GUTTATA Linden & André, Ill. Hort. 22:43, pl. 200. 1875. Tillandsia guttata Baker, Journ. Bot. 26:108. 1888. T. duvaliana Baker, Handb. Bromel. 212. 1889, in part. Pl. IV, fig. 9: Leaf-apex x 1/4; fig. 10: Spike x 1/4. Brazil.

53. V. OBLIQUA Quintus ex Wittm. Gartenfl. 41:201, pl. 1369. 1892. Brazil.

54. V. RETROFLEXA E. Morr. Belg. Hort. 34:185, pl. 10. 1884. Vriesea psittacina x simplex Mez in Mart. Fl. Bras. 3, pt. 3:525. 1894. V. psittacina x scalaris E. Morr. ex Mez in DC. Mon. Phan. 9:578. 1896. Pl. IV, fig. 11: Spike x 1/4. Brazil.

55. V. SIMPLEX (Vell.) Beer, Bromel. 97. 1857. Tillandsia simplex Vell. Fl. Flum. 133. 1825; Icon. 3:pl. 130. 1835. Vriesea scalaris sensu Antoine, Phyto-Icon. 30:pl. 19. 1884, not E. Morr. 1879. V. mesiana Hort. Makoy, Rev. Hort. 70:246. 1898, nomen. Pl. IV, fig. 12: Flower x 1. Trinidad, Venezuela, Colombia, Brazil.

56. V. SCALARIS E. Morr. Belg. Hort. 29:301. 1879.

Var. a. SCALARIS. Tillandsia scalaris Baker, Journ. Bot. 26: 108. 1888. Floral bracts red with yellow apices. Pl. IV, fig. 13: Flower x 1; fig. 14: Spike x 1/4. Brazil.

Var. b. VIRIDIS Mez in DC. Mon. Phan. 9:578. 1896. Floral bracts and the remainder of the inflorescence green. Brazil (?).

57. V. DELICATULA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:58, pl. 76. 1941. Brazil.

58. V. PHILIPPOCOBURGII Wawra, Oesterr. Bot. Zeitschr. 30:219. 1880. Tillandsia philippocoburgii Baker, Journ. Bot. 26:138. 1888. Pl. IV, fig. 18: Branch x 1/4. Brazil.

59. V. VAGANS (L. B. Smith) L. B. Smith, comb. nov. Vriesea philippocoburgii var. vagans L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:121, pl. 131. 1943. Brazil.

NOTE: Mulford Foster, Padre Raulino Reitz, and Mrs. Ada Abendroth, all consider tha above a distinct species because of their experience with it in the field and in cultivation. Accordingly I am following this unity of opinion and publishing the necessary combination to elevate the group to specific rank.

60. V. INTERROGATORIA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:117, pl. 124. 1943. Brazil.

61. V. CORCOVADENSIS (Britten) Mez in Mart. Fl. Bras. 3, pt. 3:532. 1894. Tillandsia ventricosa Wawra, Oesterr. Bot. Zeitschr. 30:222. 1880, not Griseb. 1865. T. corcovadensis Britten, Journ. Bot. 26:172. 1888. T. oligantha Baker, Handb. Bromel. 215. 1889, in part, not as to type. Vriesea rubida E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:574. 1894. V. ventricosa Mez in DC. Mon. Phan. 9:583. 1896. Brazil.

62. V. POENULATA (Baker) E. Morr. ex Mez in Mart. Fl. Bras. 3, pt. 3:573, pl. 106. 1894. Tillandsia glaziovii E. Morr. ex Baker, Handb. Bromel. 229. 1889. T. poenulata Baker, op. cit. 230. Brazil.

63. V. FLAMMEA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:59, pl. 79. 1941, not hort. Duval 1902, nomen. Pl. VI, fig. 3: Leaf x 1/4; fig. 4:Spike x 1/4. Brazil.

## Section XIPHION

64. V. CHONTALENSIS (Baker) L. B. Smith, Contr. U. S. Nat. Herb. 29:518, fig. 76. 1951. Tillandsia chontalensis Baker, Journ. Bot. 25:237. 1887. T. spuria Mez & Wercklé, Fedde Rep. Spec. Nov. 16:74. 1919. Nicaragua to Peru.

65. V. CRENULIPETALA (Mez) L. B. Smith, Phytologia 5:288. 1955. Tillandsia crenulipetala Mez, Fedde Rep. Spec. Nov. 16:76. 1919. T. attenuata Rusby, Descr. So. Am. Pl. 4. 1920. Colombia.

66. V. APPENDICULATA (L. B. Smith) L. B. Smith, Contr. U. S. Nat. Herb. 29:445. 1951. Tillandsia appendiculata L. B. Smith, Lloydia 11:307, fig. 6. 1949. Ecuador.

67. V. HETERANDRA (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:443. 1951. Tillandsia heterandra André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. 60:567. Dec. 16, 1888. Venezuela to Bolivia

68. V. LACERA (L. B. Smith) L. B. Smith, Fieldiana Bot. 28: 831. 1957. Tillandsia lacera L. B. Smith, op. cit. 28:150, fig. 22 D-F. 1951. Venezuela.

69. V. DIDISTICHOIDES (Mez) L. B. Smith, Phytologia 5:281. 1955. Tillandsia didistichoides Mez in DC. Mon. Phan. 9:778. 1896. Pl. I, fig. 5: Spike x 1/4. Mexico, West Indies, Venezuela, Colombia.

70. V. FRAGRANS (André) L. B. Smith, Contr. U. S. Nat. Herb. 29:443. 1951. Tillandsia fragrans André, Énum. Bromél. 7. Dec. 13, 1888; Rev. Hort. 60:567. Dec. 16, 1888. Pl. I, fig. 6: Spike x 1/4. Colombia, Ecuador.

71. V. DREWII L. B. Smith, Phytologia 5:401, pl. 1, figs. 4-7. 1956. Ecuador.

72. V. DREPANOCARPA (Baker) Mez In DC. Mon. Phan. 9:581. 1896. Tillandsia drepanocarpa Baker, Journ. Bot. 26:41. 1888. Vriesea dusenii L. B. Smith, Contr. Gray Herb. 98:17, pl. 5, figs. 3, 4. 1932. Pl. I, fig. 11: Spike x 1/2. Brazil.

73. V. GONIORACHIS (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894. Tillandsia goniorachis Baker, Journ. Bot. 25:303.

1887. Brazil.

74. V. JIMENEZII Mez & Tonduz, Fedde Rep. Spec. Nov. 14:246. 1916. Costa Rica.

75. V. SULCATA L. B. Smith, Mem. New York Bot. Gard. 9:315, fig. 58. 1957. Venezuela.

76. V. FUNEBRIS L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:117, pl. 122. 1943. Brazil.

77. V. SODERSTROMII L. B. Smith, Bromeliad Soc. Bull. 13:52, fig. 1963. British Guiana.

78. V. GLUTINOSA Lindl. Gard. Chron. 388. 1856. Tillandsia glutinosa sensu Griseb. Fl. Brit. W. Ind. 597. 1864, not Mart. ex Schult. 1830. T. stenostachya Baker, Journ. Bot. 26:109. 1888. Vriesea stenostachya Mez In DC. Mon. Phan. 9:564. 1896. Pl. I, fig. 13: Spike x 1/8; fig. 14: Sepal x 1. Trinidad.

79. V. ELATA (Baker) L. B. Smith, Phytologia 5:288. 1955. Tillandsia elata Baker, Journ. Bot. 26:46. 1888. T. excelsa Mez, wrongly attributed to Wittm., in DC. Mon. Phan. 9:766. 1896. T. exaltata Mez, loc. cit. Colombia.

80. V. CHRYSOSTACHYS E. Morr. Belg. Hort. 31:87. 1881.

Var. a. CHRYSOSTACHYS. Tillandsia chrysostachys Baker, Bot. Mag. 112:pl. 6906. 1886. T. trinitensis Baker, Handb. Bromel. 211. 1889. Vriesea aurea hort. ex Baker, op. cit. 222, nomen. V. cryptantha hort. ex Baker, loc. cit., nomen. Leaves rounded and apiculate or broadly acute, 4-5 cm wide; inflorescence simple or rarely digitate; petals yellow. Pl. I, fig. 15: Inflorescence x 1/8. Trinidad, Colombia, Peru.

Var. b. STENOPHYLLA L. B. Smith, Bot. Mus. Leafl. Harvard 17: 71. 1955. Leaves acuminate, about 1 cm wide; inflorescence simple; petals white. Colombia.

81. V. CAMPTOCLADA Mez & Wercklé, Fedde Rep. Spec. Nov. 14: 247. 1916. Costa Rica.

82. V. HODGEI L. B. Smith, Caldasia 5:14, fig. 1948. Colombia.

83. V. SUBANDINA (Ule) Sm. & Pitt. Journ. Wash. Acad. Sci. 43: 404. 1953. Cipuropsis subandina Ule, Verhandl. Bot. Ver. Brandenb. 48:148. 1907. Tillandsia subandina Mez ex L. B. Smith, Contr. Gray Herb. 98:16. 1932. Peru.

84. V. RUBRA (R. & P.) Beer, Bromel. 98. 1857. Tillandsia rubra R. & P. Fl. Per. 3:40, pl. 266. 1802. Vriesea albiflora Ule, Verhandl. Bot. Ver. Brandenb. 48:141. 1907. Tillandsia rhododactyla Mez, Fedde Rep. Spec. Nov. 16:76. 1919. Trinidad, northern South America.

85. V. PEDICELLATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum pedicellatum Mez & Wercklé, Bull. Herb. Boiss. II. 3:136. 1903. Costa Rica.

86. V. SCEPTRUM Mez in DC. Mon. Phan. 9:606. 1896. Brazil.

87. V. EGREGIA L. B. Smith, Phytologia 4:355, pl. 1, figs. 4-6. 1953. Venezuela.

88. V. HOSPITALIS (L. B. Smith) L. B. Smith, Phytologia 5:397. 1956. Tillandsia hospitalis L. B. Smith, Caldasia 5:13, fig. 1948. Colombia.

89. V. MAGDALENAE L. B. Smith, Phytologia 8:500, pl. 2, fig.

6-8. 1963. Colombia.

90. V. RANIFERA L. B. Smith, Phytologia 9:242, pl. 1, figs. 1, 2. 1963. Costa Rica.

91. V. THYRSOIDEA Mez in Mart. Fl. Bras. 3, pt. 3:556. 1894. Brazil.

92. V. ALTODASERRAE L. B. Smith, Contr. Gray Herb. 98:16, pl. 5, figs. 1, 2. 1932. Pl. I, fig. 19: Spike x 1/4. Brazil.

93. V. HAEMATINA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:117, pl. 123. 1943. Brazil.

94. V. MONACORUM L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:119, pl. 127. 1943. Brazil.

95. V. KILLIPIANA L. B. Smith, Phytologia 5:42, pl. 5, figs. 1-3. 1954. Colombia.

96. V. GIGANTEA Gaud. Atl. Voy. Bonite pl. 70 (except the base of the inflorescence erroneously shown as simple). 1843. _Tillandsia_ _gigantea_ Griseb. Fl. Brit. W. Ind. 597. 1864. _T._ _tessellata_ Linden, Catal. 9. 1873. _Vriesea_ _tessellata_ E. Morr. Belg. Hort. 32:381, pls. 14-16. 1882. _Tillandsia_ _reticulata_ Baker, Gard. Chron. III. 1:140. 1887. _Vriesea_ _reticulata_ Mez in Mart. Fl. Bras. 3, pt. 3:557. 1894. _V._ _mosenii_ Mez, op. cit. 558. _V._ _alexandrae_ hort. Sander, Gard. Chron. 245. 1903. Pl. I, fig. 25: Section of spike x 1/2. Brazil.

97. V. PARADOXA Mez in DC. Mon. Phan. 9:604. 1896. Brazil.

98. V. LATISSIMA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. _Thecophyllum_ _latissimum_ Mez & Wercklé, Bull. Herb. Boiss. II. 4:1122. 1904. Costa Rica.

99. V. TURBINATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. _Thecophyllum_ _turbinatum_ Mez & Wercklé, Bull. Herb. Boiss. II. 4:1122. 1904. Costa Rica.

100. V. LANGUIDA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:118, pl. 125, fig. 1. 1943. Brazil.

101. V. TRILIGULATA Mez in Mart. Fl. Bras. 3, pt. 3:541. 1894. Brazil.

102. V. MACULOSA Mez, Fedde Rep. Spec. Nov. 12:418. 1913. Brazil.

103. V. STRICTA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:122, pl. 133. 1943. Brazil.

104. V. MINARUM L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:118, pl. 126. 1943. Brazil.

105. V. HELICONIOIDES (HBK.) Hook. ex Walp. Ann. Bot. 3:623. 1852. _Tillandsia_ _heliconioides_ HBK. Nov. Gen. & Sp. 1:293. 1816. _T._ _disticha_ Willd. ex Schult. in R. & S. Syst. 7:1226. 1830, in synonymy, not _Renealmia_ _disticha_ L. 1759. _Vriesea_ _falkenbergii_ hort. Bull, Gard. Chron. 1:759. 1880. _V._ _bellula_ hort. Linden, Cat. no. 109:7. 1883. _V._ _disticha_ Kuntze, Rev. Gen. 3, pt. 2:304. 1898. _Guzmania_ _obtusa_ Rusby, Mem. N. Y. Bot. Gard. 7: 212. 1927. _Vriesea_ _bullata_ hort. ex C. Chevalier, Bull. Soc. Nat.Hort. France V. 3:349. 1930. Pl. II, fig. 4: Spike x 1/4. Central America and Colombia to Bolivia and Brazil.

106. V. LONGICAULIS (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 542. 1894. _Vriesea_ _jonghei_ sensu Wawra, Oesterr. Bot. Zeitschr. 30:220. 1880, not E. Morr. _V._ _jonghei_ forma "_capsulis_ _secundis_",

It. Sax.-Cob. 168. 1883. *Tillandsia longicaulis* Baker, Journ. Bot. 26:80. 1888. *Vriesea longicaulis* var. *secunda* Mez in Mart. Fl. Bras. 3, pt. 3:543. 1894. Brazil.

107. V. PYCNANTHA L. B. Smith, Contr. Gray Herb. 154:38, pl. 4 figs. 10-12. 1945. Guatemala.

108. V. RUGOSA Mez & Wercklé, Bull. Herb. Boiss. II. 4:866. 1904. Costa Rica.

109. V. GLADIOLIFLORA (Wendl.) Ant. Wiener Ill. Gart. 5:98. 1880. *Tillandsia gladioliflora* Wendl. Hamb. Gartenz. 19:31. 1863. *Vriesea princeps* hort. Linden ex Batal, Gartenfl. 26:158. 1877; E. Morr. Belg. Hort. 30:216. 1880, nomen. Pl. II, fig. 14: Spike x 1/4. Guatemala to Colombia.

110. V. PACHYSPATHA Mez & Wercklé, Bull. Herb. Boiss. II. 4: 867. 1904. Costa Rica.

111. V. MACRANTHA Mez & Wercklé, Bull. Herb. Boiss. II. 4:867. 1904. Costa Rica.

112. V. OVANDENSIS Matuda, Cact. & Sucul. Mex. 2:78, fig. 51. 1957. Pl. II, fig. 15: Spike x 1/4. Mexico.

113. V. ACUMINATA Mez & Wercklé, Bull. Herb. Boiss. II. 4:868. 1904. Costa Rica.

114. V. SCHULTESIANA L. B. Smith, Bot. Mus. Leafl. Harvard 16: 197, fig. 1954. Colombia.

115. V. BRACHYPHYLLA Mez & Wercklé, Bull. Herb. Boiss. II. 4: 869. 1904. Costa Rica.

116. V. BRUNEI Mez & Wercklé, Bull. Herb. Boiss. II. 4:865. 1904. Costa Rica.

117. V. APICULATA L. B. Smith, Phytologia 8:221, pl. 2, figs. 1-3. 1962. Pl. III, fig. 1: Leaf-apex x 1/4; fig. 2: Spike x 1/4. Costa Rica.

118. V. LANCIFOLIA (Baker) L. B. Smith, Lilloa 6:386, pl. 2, figs. 3, 4. 1941. *Tillandsia lancifolia* Baker, Handb. Bromel. 202. 1889. *Vriesea platzmannii* Mez in Mart. Fl. Bras. 3, pt. 3: 546. 1894, in part, not as to type. Brazil.

119. V. PARVIFLORA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:119, pl. 125, fig. 2. 1943. Brazil.

120. V. MACROSTACHYA (Bello) Mez in DC. Mon. Phan. 9:601. 1896. *Caraguata macrostachya* Bello, Anal. Soc. Esp. Hist. Nat. 12:122. 1883. *Neovriesia macrostachya* Britton in Britton & Wilson, Sci. Surv. Porto Rico 5:142. 1923. Cuba, Puerto Rico, Venezuela.

121. V. FENESTRALIS Linden & André, Ill. Hort. 22:124, pl. 215. 1875. *Tillandsia fenestralis* Hook. f. Bot. Mag. 112:pl. 6898. 1886. *Vriesea fenstrata* hort. Rev. Hort. 66:285. 1894, nomen. *V. hamata* L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:59, pl. 77. 1941. Pl. III, fig. 8: Leaf-apex x 1/4; fig. 9: Spike x 1/4. Brazil.

122. V. ATRA Mez in Mart. Fl. Bras. 3, pt. 3:543, pl. 101. 1894. Brazil.

123. V. JONGHEI (K. Koch) E. Morr. Belg. Hort. 28:257. 1878. *Encholirion jonghii* Libon ex K. Koch, Allg. Gartenz. 22. 1857, nomen. *Tillandsia jonghei* K. Koch, Wochenschr. 11:91. 1868. *Vriesea xiphion* Platzmann ex E. Morr. Belg. Hort. 24:291. 1874,

nomen. *Encholirion ynghii* May, Rev. Hort. 50:140. 1878, probably an error for "*jonghei*". *Vriesea gamba* F. Mueller, Flora 83:460. 1897. Pl. IV, fig. 1: Spike x 1/4. Trinidad, Brazil.

124. V. FOSTERIANA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:116, pl. 121. 1943. Pl. IV, figs. 2: Leaf-apex x 1/4; fig. 3: Section of spike x 1/4. Brazil.

125. V. PLATYNEMA Gaud. Atl. Voy. Bonite pl. 66. 1843.

1. Flowers distichous throughout; sepals all exceeding the floral bracts.
  2. Leaf-blades essentially concolorous.
    3. Leaves rounded and apiculate.
      4. Sepals obtuse.
        5. Scape stout; rhachis 5 mm in diameter or more.
          6. Floral bracts red........................Var. a. *platynema*
          6. Floral bracts yellow........................Var. b. *flava*
        5. Scape slender; rhachis scarcely more than 2 mm in diameter............................Var. c. *gracilior*
      4. Sepals acute.............................Var. d. *libonii*
    3. Leaves acuminate..............................Var. e. *rosea*
  2. Leaf-blades not concolorous.
    7. Leaf-blades pale-striate....................Var. f. *striata*
    7. Leaf-blades red-violet beneath, green above, pale-striate near apex..............................Var. g. *variegata*
1. Flowers at base of inflorescence polystichous with sepals shorter than the floral bracts.............Var. h. *wrightii*

Var. a. PLATYNEMA. *Tillandsia platynema* Griseb. Nachr. Ges. Wiss. Goett. 1864:19. 1865, as to basonym. *Encholirion corallinum* J. Linden, Catal. 19:27. 1865. *Vriesea corallina* Regel, Gartenfl. 19:354, pl. 671. 1870. *Encholirium corallinum* Linden ex André, Ill. Hort. 18:136, pl. 70. 1871. *Tillandsia corallina* K. Koch, Ind. Sem. Hort. Berol. 1873, App. 4:5. 1874. *Tillandsia bicolor* sensu Niederlein, Bull. Mens. Prod. Arg. 3:332. 1890. Pl. IV, fig. 4: Leaf-apex x 1/4; fig. 5: Section of spike x 1/4. West Indies, eastern South America.

Var. b. FLAVA Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:15. 1952. Brazil.

Var. c. GRACILIOR L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:121. 1943. Brazil.

Var. d. LIBONII Mez in Mart. Fl. Bras. 3, pt. 3:553. 1894. *Encholirion liboni* hort. ex Baker, Handb. Bromel. 220. 1889, nomen. Brazil (?).

Var. e. ROSEA (hort. ex Antoine) Mez in Mart. Fl. Bras. 3, pt. 3:552. 1894. *Vriesea rosea* E. Morr. ex Mez, loc. cit., nomen.

Var. f. STRIATA (Wittm.) Wittm. ex Mez in Mart. Fl. Bras. 3, pt. 3:553. 1894. *Vriesea corallina* var. *striata* Wittm. Bot. Jahrb. 13, Beibl. 29:6. 1891. Brazil.

Var. g. VARIEGATA (Guillon) Reitz, Anais Bot. Herb. Barbosa Rodrigues 4:15. 1952. *Encholirion roseum variegatum* Guillon, Rev. Hort. 55:470. 1883. Brazil.

Var. h. WRIGHTII (L. B. Smith) L. B. Smith, Phytologia 7:174.

1960. *Guzmania wrightii* L. B. Smith, Contr. Gray Herb. 117:11. 1937. *Vriesea wrightii* Carabia, Mem. Soc. Cub. Hist. Nat. 15: 361. 1941. Cuba.

126. V. WAWRANEA Ant. Phyto-Icon. 1, pls. 1, 2. 1884. *Tillandsia wawranea* Baker, Journ. Bot. 26:105. 1888. Brazil.

127. V. BITUMINOSA Wawra, Oesterr. Bot. Zeitschr. 12:347. 1862. *Tillandsia platynema* sensu Baker, Journ. Bot. 26:106. 1888, in part. *Vriesea platynema* Wittm. Bot. Jahrb. 13, Beibl. 29:21. 1891. Pl. IV, fig. 6: Base of spike x 1/4. Venezuela, Brazil.

128. V. REGNELLII Mez in Mart. Fl. Bras. 3, pt. 3:548, pl. 102. 1894. Brazil.

129. V. NUTANS L. B. Smith, Phytologia 7:175, pl. 2, figs. 6, 7. 1960. Costa Rica.

130. V. CRASSA Mez in Mart. Fl. Bras. 3, pt. 3:566, pl. 104. 1894. Brazil.

131. V. DENSIFLORA Mez in Mart. Fl. Bras. 3, pt. 3:567. 1894. Brazil.

132. V. DISSITIFLORA (C. Wright) Mez In DC. Mon. Phan. 9:604. 1896. *Tillandsia dissitiflora* C. Wright in Sauvalle, Anal. Acad. Ci. Habana 8:54. 1872. *Vriesea erici* Harms, Notizblatt 12:533. 1935. Cuba.

133. V. TUERCKHEIMII (Mez) L. B. Smith, Contr. Gray Herb. 117: 33. 1937. *Tillandsia tuerckheimii* Mez in Urb. Symb. Ant. 7:174. 1912. Pl. IV, fig. 15: Section of branch x 1/4; fig. 16: Sepal x 1; fig. 17: Petal x 1. Hispaniola.

134. V. SPARSIFLORA L. B. Smith, Contr. Gray Herb. 95:48, pl. 10, figs. 1, 2. 1931. Brazil.

135. V. TRIFLORA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum panniculatum* Mez & Wercklé, Bull. Herb. Boiss. II. 4:1123. 1904, not *Vriesea paniculata* Mez 1896. Costa Rica.

136. V. DISCOLOR (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum discolor* Mez & Wercklé, Fedde Rep. Spec. Nov. 14:246. 1916. Costa Rica.

137. V. SWARTZII (Baker) Mez, Engl. Pflanzenreich IV. 32:400. 1935. *Tillandsia swartzii* Baker, Journ. Bot. 26:12. 1888. *Tillandsia paniculata* Sw. ex Baker, loc. cit. as synonym, not L. 1762. Jamaica.

138. V. RINGENS (Griseb.) Harms, Notizblatt 10:801. 1929. *Tillandsia ringens* Griseb. Cat. Pl. Cub. 255. 1866. *T. chagresiana* Baker, Journ. Bot. 26:109. 1888. *T. veitchii* Baker, Handb. Bromel. 223. 1889. *Vriesea veitchii* E. Morr. ex Baker, loc. cit. nomen. *V. paniculata* Mez in DC. Mon. Phan. 9:614. 1896, as to *Tillandsia ringens* Griseb. not as to basonym. Pl. IV, fig. 19: Branch x 1/2. Costa Rica to Colombia, West Indies.

139. V. MORRENII Wawra, Oesterr. Bot. Zeitschr. 30:219. 1880. *Vriesea morrenii* var. *disticha* Wawra, op. cit. 220. *Tillandsia morrenii* Baker, Journ. Bot. 26:139. 1888. Brazil.

140. V. RUSCHII L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:59, pl. 78. 1941. Brazil.

141. V. HOEHNEANA L. B. Smith, Proc. Am. Acad. 68:150, pl. 1,

figs. 11-13. 1933. Vriesea tweedieana Mez in DC. Mon. Phan. 9: 608. 1896, in part (?), not as to basonym. V. tessellata sensu Hoehne, Album Sec. Bot. Mus. Paulista 97, fig. 1925, not E. Morr. Brazil.

142. V. AMAZONICA (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:554. 1894. Tillandsia gigantea Mart. ex Schult. in R. & S. Syst. 7: 1224. 1830. T. amazonica Baker, Journ. Bot. 26:108. 1888. Vriesea gigantea Mez in Mart. Fl. Bras. 3, pt. 3:566. 1894, not Gaud. 1846. Trinidad, Guiana, Amazonian Brazil.

143. V. ITATIAIAE Wawra, Oesterr. Bot. Zeitschr. 30:221. 1880. Tillandsia itatiaiae Baker, Journ. Bot. 26:110. 1888. Vriesea schenckiana Wittm. Bot. Jahrb. 13, Beibl. 29:20. 1891. Pl. V, fig. 1: Branch x 1/4. Brazil.

144. V. CONFUSA L. B. Smith, sp. nov. A V. camptoclada Mez & Wercklé, cui affinis, inflorescentia pauciramosa, spicarum basibus sterilibus elongatis multibracteatisque differt.

PLANT flowering 9-10 dm high. LEAVES rosulate, to 8 dm long, minutely and obscurely lepidote throughout; sheaths broadly elliptic, ca. 15 cm long, nearly black beneath; blades ligulate, broadly acute with a stout involute terminal cusp, 7-8 cm wide, flat. SCAPE erect, rather slender; scape-bracts strict, imbricate, the lowest subfoliaceous, the others broadly ovate with a cuspidate apex. INFLORESCENCE typically of 2 branches with long sterile laxly bracteate bases; spikes oblong, densely many-flowered, 15-17 cm long (fertile part); rhachis nearly straight, subalate, 4 mm wide; floral bracts 3 times the internodes but spreading at anthesis and exposing the rhachis, not secund, broadly ovate, rounded and apiculate, 25 mm long, very broadly convex and ecarinate, coriaceous, even, glabrous, green (! Foster); flowers slightly secund at anthesis; pedicels slenderly obconic, to 10 mm long in fruit. SEPALS broadly elliptic, 17 mm long, ecarinate, coriaceous, even; petals oblong, exceeding the stamens, white, musky and opening at night (! Foster). CAPSULE cylindric, acute, beaked, 3 cm long. Pl. V, fig. 2: Inflorescence x 1/6; fig. 3: Sepal x 1.

COLOMBIA: Nariño: Epiphytic, Barbacoas, 17 November 1946, M. B. Foster 2193 (US, type).

145. V. CORNUS-CERVI Rohweder, Univ. Hamburg, Abh. Geb. Auslandsk. 61, Reihe C, Naturwiss. 18:82, figs. 79, 89. 1956. Salvador.

146. V. HIEROGLYPHICA (Carr.) E. Morr. Ill. Hort. 31:41, pl. 514. 1884. Massangea hieroglyphica Carr. Rev. Hort. 50:175, figs. 33, 34. 1878. Tillandsia hieroglyphica Baker, Journ. Bot. 26:110. 1888. Massangea santoviensis hort. ex Baker, Handb. Bromel. 149. 1889, nomen. M. tigrina hort. ex Baker, op. cit. 224, nomen. Pl. V, fig. 6: Leaf-apex x 1/4; fig. 7: Branch x 1/4. Brazil.

147. V. PENDULIFLORA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:120, pl. 129. 1943. Brazil.

148. V. SEGADAS-VIANNAE L. B. Smith, Smithsonian Misc. Coll. 126:35, 120, fig. 40. 1955. Brazil.

149. V. WERCKLEANA Mez, Bull. Herb. Boiss. II. 3:136. 1903.

Pl. V, fig. 8: Apex of branch x 1/4. Mexico, Guatemala, Costa Rica.

150. V. KUPPERIANA Suessenguth, Bot. Arkiv 39:384, fig. 1. 1939. Costa Rica.

151. V. SANGUINOLENTA Cogn. & March. Pl. Ornem. pl. 52. 1874. Tillandsia sanguinolenta Baker, Handb. Bromel. 226. 1889. Vriesea alfarovii Mez, Fedde Rep. Spec. Nov. 14:247. 1916. Encholirion sanguinolentum hort. ex C. Chevalier, Bull. Soc. Nat. Hort. France V. 3:349. 1930. Vriesea urbaniana Harms, Notizblatt 12: 532. 1935. Pl. V, fig. 9: Branch x 1/5. Costa Rica to Colombia, Greater Antilles.

152. V. LONGISCAPA Ule, Bericht. Deutsch. Bot. Gesellsch. 18: 323. 1900. Brazil.

153. V. CEARENSIS L. B. Smith, Phytoligia 7:255, pl. 1, figs. 11, 12. 1960. Brazil.

154. V. HYDROPHORA Ule, Arch. Mus. Nac. Rio de Janeiro 10:189. 1899; Bericht. Deutsch. Bot. Gesellsch. 17:2. 1899. Brazil.

155. V. PASTUCHOFFIANA Glaziou ex Mez in Mart. Fl. Bras. 3, pt. 3:564. 1894. Tillandsia pastuchoffiana hort. ex Baker, Handb. Bromel. 226. 1889, nomen. Brazil.

156. V. PECTINATA L. B. Smith, Lilloa 6:387, 393, pl. 1, figs. 10-13. 1941. Guatemala.

157. V. CLAUSSENIANA (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894. Tillandsia clausseniana Baker, Handb. Bromel. 213. 1889. Brazil.

158. V. WOODSONIANA L. B. Smith, Ann. Missouri Bot. Gard. 26: 275, pl. 20. 1939. Panama.

159. V. PACHYCHLAMYS Mez in DC. Mon. Phan. 9:594. 1896. Tillandsia pachychlamys Baker ex Mez, loc. cit., nomen. British Guiana.

160. V. TONDUZIANA L. B. Smith, No. Am. Fl. 19:166. 1938; Lilloa 6:397, pl. 2, figs. 18, 19. 1941. Costa Rica.

161. V. VANHYNINGII L. B. Smith, Phytologia 7:173, pl. 2, figs. 1-3. 1960. Pl. V, fig..10: Leaf-apex x 1/4; fig. 11: Spike x 1/4. Mexico.

162. V. UNILATERALIS (Baker) Mez in Mart. Fl. Bras. 3, pt. 3: 545. 1894. Tillandsia unilateralis Baker, Journ. Bot. 26:105. 1888. Brazil.

163. V. BICOLOR L. B. Smith, Phytologia 7:174, pl. 2, figs. 4, 5. 1960. Costa Rica.

164. V. GUADELUPENSIS (Baker) Mez in DC. Mon. Phan. 9:596. 1896. Tillandsia guadelupensis Baker, Handb. Bromel. 213. 1889. Neovriesia guadalupensis Britton ex Stehlé, Fl. Guadeloupe 1:212. 1936, nomen. Lesser Antilles.

165. V. SUBSECUNDA Wittm. Bot. Jahrb. 11:69. 1889. Tillandsia subsecunda Baker, Handb. Bromel. 217. 1889. Vriesea diminuta Mez & Wercklé, Bull. Herb. Boiss. II. 4:869. 1904. Costa Rica, Panama.

166. V. PITTIERI Mez, Bull. Herb. Boiss. II. 3:135. 1903. Costa Rica.

167. V. AMPLA L. B. Smith, Phytologia 8:497, pl. 1, figs. 4-6. 1963. Costa Rica.

168. V. VIRIDIFLORA (Regel) Wittm. ex Mez, Engl. Pflanzenreich IV. 32:387. 1935. Pitcairnia viridiflora Regel, Ind. Sem. Hort. Petrop. 1866:81. 1867. Tillandsia viridiflora Regel, loc. cit., nomen. Vriesea viminalis E. Morr. Belg. Hort. 28:257, pl. 14, 15. 1878. Tillandsia viminalis Hemsl. Biol. Centr. Am. Bot. 3: 323. 1884. Pl. V, fig. 12: Spike x 1/4. Central America, British Guiana, Venezuela, Colombia.

169. V. MARNIER-LAPOSTOLLEI L. B. Smith, Bromel. Soc. Bull. 14:108, figs. 1964. Pl. V, fig. 13: Spike-apex x 1/4. Costa Rica.

170. V. HAPLOSTACHYA (C. Wright) L. B. Smith, Contr. Gray Herb. 114: 9, pl. 2, fig. 6. 1936. Tillandsia haplostachya C. Wright in Sauvalle, Anal. Acad. Ci. Habana 8:73. 1871. Cuba.

171. V. CHIAPENSIS Matuda, Anal. Inst. Biol. Mexico 23:130. 1953. Mexico.

172. V. GRAMINIFOLIA Mez & Wercklé, Bull. Herb. Boiss. II. 4: 868. 1904. Costa Rica.

173. V. BRASSICOIDES (Baker) Mez in DC. Mon. Phan. 9:598. 1896. Tillandsia brassicoides Baker, Journ. Bot. 26:12. 1888. Brazil.

174. V. FIBROSA L. B. Smith, Mem. New York Bot. Gard. 9:315, fig. 59. 1957. Venezuela.

175. V. SOCIALIS L. B. Smith, Bot. Mus. Leafl. Harvard 12:121, fig. 1946. Colombia.

176. V. PLATZMANNII E. Morr. Belg. Hort. 25:349, pl. 23. 1875. Tillandsia platzmannii Baker, Journ. Bot. 26:104. 1888. Brazil.

177. V. VERRUCOSA L. B. Smith, Phytologia 5:44, pl. 5, figs. 4, 5. 1954. Colombia.

178. V. SCHIPPII L. B. Smith, Contr. Gray Herb. 98:18, pl. 5, figs. 5, 6. 1932. British Honduras.

179. V. MACROCHLAMYS Mez & Wercklé, Bull. Herb. Boiss. II. 4: 865. 1904. Costa Rica.

180. V. OLIGANTHA (Baker) Mez in Mart. Fl. Bras. 3, pt. 3:544. 1894. Tillandsia oligantha Baker, Journ. Bot. 25:345. 1887. Brazil.

181. V. BROADWAYI L. B. Smith, Proc. Am. Acad. Arts & Sci. 68: 149, pl. 1, figs. 9, 10. 1933. Pl. V, fig. 14: Leaf-apex x 1/4; fig. 15: Spike x 1/4. Trinidad.

182. V. RACINAE L. B. Smith, Lilloa 6:387, 413, pl. 3, figs. 5, 6. 1941. Pl. V, fig. 16: Leaf x 1/4; fig. 17: Spike x 1/4. Brazil.

183. V. VEXILLATA L. B. Smith, Bot. Mus. Leafl. Harvard 17:72, pl. 21, figs. 1, 2. 1955. Colombia.

184. V. SPLITGERBERI (Mez) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Guzmania splitgerberi Mez in DC. Mon. Phan. 9:930. 1896. Thecophyllum splitgerberi Pittendrigh, Evolution 2:60. 1948. Pl. V, fig. 18: Leaf-apex x 1/4; fig. 19: Spike x 1/4. Costa Rica, Trinidad, Guiana, Venezuela, Colombia.

185. V. DIFFUSA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. Thecophyllum laxum Mez & Wercklé, Bull. Herb. Boiss. II. 4:1123. 1904, not Vriesea laxa Mez, 1896. Costa Rica.

186. V. CAPITULIGERA (Griseb.) Sm. & Pitt. Journ. Wash. Acad.

Sci. 43:402. 1953. *Tillandsia capituligera* Griseb. Cat. Pl. Cub. 254. 1866. *T. fastuosa* André, Énum. Bromél. 8. Dec. 13, 1888; Rev. Hort. 60:568. Dec. 16, 1888. *Guzmania fastuosa* André ex Mez in DC. Mon. Phan. 9:926. 1896. *G. capituligera* Mez, loc. cit. *Schlumbergeria capituligera* Harms, Notizblatt 10:804. 1929. *Thecophyllum capituligerum* L. B. Smith, Contr. Gray Herb. 98:14. 1932. *T. fastuosum* Mez, Engl. Pflanzenreich IV. 32:423, fig. 90. 1935. Pl. V, fig. 20: Spike x 1/4. West Indies, Venezuela, Colombia, Ecuador.

187. V. CRASSIFLORA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum crassiflorum* Mez & Wercklé, Bull. Herb. Boiss. II. 3:138. 1903. Costa Rica.

188. V. CYLINDRACEA (Suessenguth & Goeppinger) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum cylindraceum* Suessenguth & Goeppinger, Bot. Jahrb. 72:292. 1942. Costa Rica.

189. V. LEPTOPODA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum rubrum* Mez & Wercklé, Bull. Herb. Boiss. II. 4:878. 1904, not *Vriesea rubra* Beer, 1857. Costa Rica.

190. V. BRACTEOSA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum bracteosum* Mez & Wercklé, Fedde Rep. Spec. Nov. 14:246. 1916. Costa Rica.

191. V. NEPHROLEPIS Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403 1953. *Thecophyllum werckleanum* Mez, Bull. Herb. Boiss. II. 3: 139. 1903, not *Vriesea werckleana* Mez, 1903. Costa Rica.

192. V. MONTANA (L. B. Smith) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:69. 1953. *Thecophyllum montanum* L. B. Smith, Field Mus. Pub. Bot. 17:319, pl. 7. 1938. Guatemala, Honduras.

193. V. VIOLASCENS (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum violascens* Mez & Wercklé, Bull. Herb. Boiss. II. 4:877. 1904. Costa Rica.

194. V. LEUCOPHYLLA L. B. Smith, Phytologia 8:498, pl. 2, figs. 1, 2. 1963. Costa Rica.

195. V. SPECTABILIS (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum spectabile* Mez & Wercklé, Bull. Herb. Boiss. II. 4:873. 1904. Costa Rica.

196. V. COMATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum comatum* Mez & Wercklé, Bull. Herb. Boiss. II. 4:871. 1904. Costa Rica.

197. V. ANTILLANA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Guzmania urbaniana* Mez in DC. Mon. Phan. 9:920. 1896. *Thecophyllum urbanianum* Mez, Bull. Herb. Boiss. II. 3:131. 1903, not *Vriesea urbaniana* Harms, 1935. Lesser Antilles.

198. V. JOHNSTONII (Mez) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. *Thecophyllum johnstonei* Mez, Bull. Herb. Boiss. II. 4:872. 1904. Trinidad, Venezuela (Isla Margarita).

199. V. NOTATA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum pittieri* Mez, Bull. Herb. Boiss. II. 3:137. 1903, not *Vriesea pittieri* Mez, 1903. Costa Rica.

200. V. HYGROMETRICA (André) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953.

Var. a. HYGROMETRICA. *Caraguata hygrometrica* André, Énum. Bromél. 6. Dec. 13, 1888; Rev. Hort. 60:566. Dec. 16, 1888.

Guzmania hygrometrica André ex Mez in DC. Mon. Phan. 9:919. 1896. Thecophyllum hygrometricum Mez, Bull. Herb. Boiss. II. 3:131. 1903. Colombia.

Var. b. ANGUSTIFOLIA L. B. Smith, Phytologia 8:222. 1962. Costa Rica.

201. V. PAUPERA (Mez & Sodiro) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum pauperum Mez & Sodiro, Bull. Herb. Boiss. II. 4:876. 1904. Ecuador.

202. V. PICTA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum pictum Mez & Wercklé, Bull. Herb. Boiss. II. 4:874. 1904. Costa Rica.

203. V LINEATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. Thecophyllum lineatum Mez & Wercklé, Bull. Herb. Boiss. II. 4:875. 1904. T. balanophorum var. subpictum Suesseng. Bot. Jahrb. 72:291. 1942 (?). Costa Rica.

204. V. IRAZUENSIS (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. Thecophyllum irazuense Mez & Wercklé, Bull. Herb. Boiss. II. 3:138. 1903. Costa Rica.

205. V. ORORIENSIS (Mez) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Guzmania ororiensis Mez in DC. Mon. Phan. 9:917. 1896. Thecophyllum ororiense Mez, Bull. Herb. Boiss. II. 3:131. 1903. T. kupperi Suesseng. & Goeppinger, Bot. Jahrb. 72:292. 1942. Vriesea kupperi Sm. & Pitt. Journ. Wash. Acad. Sci. 43: 402. 1953. Costa Rica.

206. V. CAPITATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. Thecophyllum capitatum Mez & Wercklé, Bull. Herb. Boiss. II. 4:873. 1904. Costa Rica.

207. V. ATTENUATA Sm. & Pitt. Journ. Wash. Acad. Sci. 43:401. 1953. Thecophyllum acuminatum L. B. Smith, Contr. Gray Herb. 117:30, pl. 2, figs. 28, 29. 1937, not Vriesea acuminata Mez & Wercklé, 1904. Costa Rica.

208. V. STENOPHYLLA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum stenophyllum Mez & Wercklé, Bull. Herb. Boiss. II. 4:875. 1904. Costa Rica.

209. V. BALANOPHORA (Mez) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:402. 1953. Guzmania balanophora Mez in DC. Mon. Phan. 9:918. 1896. Thecophyllum balanophorum Mez, Bull. Herb. Boiss. II. 3: 131. 1903. Costa Rica.

210. V. VIRIDIS (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum viride Mez & Wercklé, Bull. Herb. Boiss. II. 4:872. 1904. Costa Rica.

211. V. HAINESIORUM L. B. Smith, Phytologia 8:498, pl. 1, fig. 7-10. 1963. Costa Rica.

212. V. WILLIAMSII L. B. Smith, Phytologia 6:193, pl. 1, figs. 1, 2. 1958. Costa Rica.

213. V. STANDLEYI (L. B. Smith) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Thecophyllum standleyi L. B. Smith, Contr. Gray Herb. 117:30, pl. 2, figs. 30, 31. 1937. Costa Rica.

214. V. SINTENISII (Baker) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. Caraguata sintenisii Baker, Handb. Bromel. 145. 1889. Guzmania sintenisii Mez in DC. Mon. Phan. 9:920. 1896. Thecophyllum sintenisii Mez, Bull. Herb. Boiss. II. 3:131. 1903.

Puerto Rico.

215. V. SINGULIFLORA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum singuliflorum* Mez & Wercklé, Bull. Herb. Boiss. II. 4:870. 1904. Costa Rica.

216. V. VITTATA (Mez & Wercklé) Sm. & Pitt. Journ. Wash. Acad. Sci. 43:403. 1953. *Thecophyllum vittatum* Mez & Wercklé, Bull. Herb. Boiss. II. 4:871. 1904. Costa Rica.

217. V. MALZINEI E. Morr. Belg. Hort. 24:313, pl. 14. 1874. *Tillandsia malzinei* Baker, Rep. Kew Gard. 1878:59. 1879. Pl. VI, fig. 1: Leaf x 1/4; fig. 2: Spike x 1/4. Mexico.

## Subgenus ALCANTAREA

218. V. EXTENSA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:116, pl. 120. 1943. *Vriesea regina* sensu Wittm. Gartenfl. 40:160, figs. 46, 47. 1891. Brazil.

219. V. ALTA (Baker) E. Morr. ex Mez in DC. Mon. Phan. 9:617. 1896. *Tillandsia alta* Baker, Handb. Bromel. 226. 1889. Pl. I, fig. 23: Flower and bract x 1/5. Panama, Jamaica (?).

220. V. GENICULATA (Wawra) Wawra, It. Max. 156, pl. 25 (except the serrate leaves). 1866. *Platystachys geniculata* Wawra, Oesterr. Bot. Zeitschr. 12:345. 1862. *Vriesea gigantea* sensu Lem. Ill. Hort. 14:pl. 516. 1867, not as to description. *V. glaziouana* Lem. Ill. Hort. 14, Misc.:43, fig. 2. 1867. *V. gigantea* sensu Regel, Gartenfl. 16:385. 1867. *V. regina* sensu Gard. Chron. n. ser. 3:234, fig. 41. 1875. *V. regina* var. *glaziouana* Wawra, Oesterr. Bot. Zeitschr. 30:218. 1880. *V. gigantea* sensu Carr. Rev. Hort. 57:387. 1885 (?). *Tillandsia regina* sensu Baker, Journ. Bot. 26:139. 1888, in part. *Vriesea vasta* Mez in Mart. Fl. Bras. 3, pt. 3:572. 1894. Pl. I, fig. 24: Spike x 1/4. Brazil.

221. V. REGINA (Vell.) Beer, Bromel. 97. 1857. *Tillandsia regina* Vell. Fl. Flum. 136. 1825; Icon. 3:pl. 142. 1835. *T. blokii* Hemsl. Bot. Mag. 134:pl. 8192. 1908. *Alcantarea regina* Harms, Engl. & Prantl, Pflanzenfam. ed. 2, 15a:126. 1930. *Vriesea blokii* Mez, Engl. Pflanzenreich IV. 32:405. 1935. Pl. II, fig. 1: Section of spike x 1/4. Brazil.

222. V. BRASILIANA L. B. Smith, Arquiv. Bot. Estado S. Paulo n. ser. 1:115, pl. 119. 1943. *Vriesea regina* Mez in Mart. Fl. Bras. 3, pt. 3:569. 1894, in part. Pl. II, fig. 2: Apex of spike x 1/4. Brazil.

223. V. GIBBA L. B. Smith, Contr. U. S. Nat. Herb. 29:524, fig. 80. 1954. Jamaica.

224. V. IMPERIALIS Carr. Rev. Hort. 60:58. 1888. *Vriesea gigantea* sensu Lem. Ill. Hort. 14:sub pl. 516. 1867, as to description, not as to plate, nor Gaud., also as to Misc.:43, fig. 1. *V. glaziouana* Carr. Rev. Hort. 53:50, fig. 15, pl. 1881, not Lem. 1867. *V. hillegeeriana* hort. ex Ant. Phyto-Icon. 15. 1884, nomen *Tillandsia regina* sensu Baker, Handb. Bromel. 227. 1889, in part. *Alcantarea imperialis* Harms, Engl. & Prantl, Pflanzenfam. ed. 2. 15a:126. 1930. Pl. V, fig. 4: Leaf-apex x 1/4; fig. 5: Branch x 1/4. Brazil.

## INDEX

(by species numbers of Vriesea)

ALCANTAREA imperialis 224; regina 221.

CARAGUATA hygrometrica 200; macrostachya 120; sintenisii 214.

CIPUROPSIS subandina 83.

ENCHOLIRION corallinum 125; liboni 125d; roseum variegatum 125g; sanguinolentum 151.

ENCHOLIRIUM corallinum 125.

GUZMANIA balanophora 209; capituligera 186; fastuosa 186; hygrometrica 200; ororiensis 205; sintenisii 214; splitgerberi 184; urbaniana 197; wrightii 125h.

GUZVRIESEA magnifica - see appendix under Vriesea magnifica.

MASSANGEA hieroglyphica 146; santoviensis 146; tigrina 146.

NEOVRIESIA guadalupensis 164; macrostachya 120.

PITCAIRNIA viridiflora 168.

PLATYSTACHYS geniculata 220.

SCHLUMBERGERIA capituligera 186

THECOPHYLLUM acuminatum 207; balanophorum 209; balanophorum var. subpictum 203; bracteosum 190; capitatum 206; capituligerum 186; comatum 196; crassiflorum 187; cylindraceum 188; discolor 136; fastuosum 186; hygrometricum 200; irazuense 204; johnstonei 198; kupperi 205; latissimum 98; laxum 185; lineatum 203; montanum 192; ororiense 205; panniculatum 135; pauperum 201; pedicellatum 85; pictum 202; pittieri 199; rubrum 189; singuliflorum 215; sintenisii 214; spectabile 195; splitgerberi 184; standleyi 213; stenophyllum 208; turbinatum 99; urbanianum 197; violascens 193; viride 210; vittatum 216; werckleanum 191.

TILLANDSIA alta 219; amazonica 142; amethystina 46; appendiculata 66; appuniana 37b; arpocalyx 9; attenuata 65; barclayana 14; barilletii 32; "bicolor" 125; brassicoides 173; capituligera 186; carinata 31, 38; var. constricta 40; cereicola 3; chontalensis 64; chrysostachys 80; clausseniana 157; corallina 125; corcovadensis 61; crenulipetala 65; crousseana 50; decurvata 48; didistichoides 69; dissitiflora 132; disticha 105; drepanocarpa 72; duvaliana 39, 52; elata 79; ensiformis 50; erectiflora 28; ernestii 28c; exaltata 79; excelsa 79; fastuosa 186; fenestralis 121; fragrans 70; haplostachya 170; harmsiana 7; heliconioides 105; heterandra 67; heterostachys 50; hieroglyphica 146; hitchcockiana 1; hospitalis 88; gigantea Griseb. 96; gigantea Mart. 142; gladioliflora 109; glaziovii 62; goniorachis 73; glutinosa 25, 78; gracilis Griseb. 28a; gracilis Ule 28c; gradata 29; guttata 51, 52; guadelupensis 164; incurvata 34; inflata 35, 36; itatiaiae 143; jonghei 123; lacera 68; lancifolia 118; lateritia 14; laxa 44; longibracteata 37b; longicaulis 106; lubbersii 12; malzinei 217; maxoniana 45; morrenii 139; oligantha 61, 180; pachychlamys 159; paniculata Sw. 137; paraibica 40; pastuchoffiana 155; patula 15; pereziana 11; philippocoburgii 58; picta 37; platynema 125, 127; platzmannii 176; poenulata 62; procera 28; psittacina 38, 47; recurvata Baker 48; regina 220, 221, 224; reticulata 96; rhododactyla 84; ringens 138; robusta 4; rodigasiana 23; rubra 84; sanguinolenta 151; saundersii 27; scalaris 56; selloana 50;

simplex 55; splendens 37; var. formosa 37b; spuria 64; stenostachya 78; subandina 83; subsecunda 165; swartzii 137; tequendamae 10; tessellata 96; trinitensis 80; tuerckheimii 133; unilateralis 162; ventricosa 61; viminalis 168; viridiflora 168; viscidula 28; vittata 37; warmingii 50c; wawranea 126; zebrina 37.

VRIESEA acuminata 113; albiflora 84; alexandrae 96; alfarovii 151; alta 219; altodaserrae 92; amazonica 142; amethystina 46; ampla 167; antillana 197; apiculata 117; appendiculata; argentinensis 20c; arpocalyx 9; atra 122; attenuata 207; aurea 80.

balanophora 209; barclayana 14; barilletii 32; bellula 105; bicolor 163; biguassuensis 43; billbergioides 21; var. ampla 21c; var. subnuda 21b; bituminosa 127; blokii 221; botafogensis 27; brachyphylla 115; brachystachys 38; bracteosa 190; brasiliana 222; brassicoides 173; broadwayi 181; brunei 116; brusquensis 24; bullata 105.

caldasiana 20c; camptoclada 81; capitata 206; capituligera 186; carinata 31, 38; var. constricta 40; var. inflata 35; catharinensis 28a; cearensis 153; cereicola 3; chiapensis 171; Chlorantha 4; chontalensis 64; chrysostachys 80; var. stenophylla 80b; citrina Baker 23; clausseniana 157; comata 196; conferta 50a; var. recurvata 50a; confusa 144; corallina 125a; var. striata 125f; corcovadensis 61; cornus-cervi 145; crassa 130; crassiflora 187; crenulipetala 65; crotalophora 32; crousseana 50; cryptantha 80; cylindracea 188; cylindrica 6.

delicatula 57; densiflora 131; didistichoides 69; diffusa 185; diminuta 165; discolor 136; dissitiflora 132; "disticha" 105; drepanocarpa 72; drewii 71; dusenii 72; duvaliana 31, 39.

egregia 87; elata 79; ensiformis 50; var. d. bicolor; var. var. striata 50b; var. warmingii 50c; erici 132; erythrodactylon 31; eumorpha 32; extensa 218.

falkenbergii 105; fenestralis 121; fenestrata 121; fibrosa 174; flammea L. B. Smith 63; fosteriana 124; fragrans 70; friburgensis 20; var. paludosa 20b; var. tucumanensis 20c; funebris 76.

gamba 123; geniculata 220; gibba 223; gigantea Gaud. 96; gigantea 142, 220, 224; gladioliflora 109; glaziouana Carr. 224; glaziouana Lem. 220; glutinosa Lindl. 78; glutinosa Wawra 25; var. viridis 20c; goniorachis 73; gracilis 28a; gradata 29; graminifolia 172; gravisiana 16; guadeloupensis 164; guttata 52.

haematina 93; hainesiorum 211; hamata 121; haplostachya 170; harmsiana 7; heliconioides 105; heterandra 67; hieroglyphica 146; hillegeeriana 224; hitchcockiana 1; hodgei 82; hoehneana 141; hospitalis 88; hydrophora 154; hygrometrica 200; var. angustifolia 200b.

icterica 45; imperialis 224; incurvata 34, 36; var. inflata 35; inflata 35; interrogatoria 60; irazuensis 204; itatiaiae 143.

jimenezii 74; johnstonii 198; jonghei 106, 123; forma "capsulis secundis" 106.

killipiana 95; krameri 47b; kupperi 205; kupperiana 150.

lacera 68; lancifolia 118; languida 100; latissima 98; laxa 44; leptantha 22; leptopoda 189; leucophylla 194; lineata 203; longibracteata 37b; longibracteata wartelii 37b; longicaulis 106;

VRIESEA (continued)

var. secunda 106; longiscapa 152; lopezii 3; lubbersiana 16; lubbersii 12.

macrantha 111; macrochlamys 179; macropoda 35; macrostachya 120; maculosa 102; magdalenae 89; malzinei 217; marnier-lapostollei 169; maxoniana 45; mesiana 55; minarum 104; modesta 30; monacorum 94; montana 192; morreniana 49; morrenii 139; var. disticha 139; mosenii 96; muelleri 26.

neoglutinosa 25; nephrolepis 191; notata 199; nutans 129.

obliqua 53; oligantha 180; olmosana 5; ororiensis 205; ovandensis 112.

pachychlamys 159; pachyspatha 110; paludosa 20b; "paniculata" 138; paraibica 40; paradoxa 97; pardalina 51; parviflora 119; pastuchoffiana 155; patula 15; pauciflora 42; paupera 201; pectinata 156; pedicellata 85; 147 penduliflora; pereziana 11; petropolitana 36; philippocoburgii 58; var. vagans 59; picta 202; pinottii 19; pittieri 166; platynema 125, 127; var. flava 125b; var. gracilior 125c; var. libonii 125d; var. rosea 125e; var. striata 125f; var. variegata 125g; var. wrightii 125h; platzmannii 118, 176; poenulata 62; princeps 109; procera 28; var. debilis 28d; var. gracilis 28a; var. rubra 28b; var. tenuis 28c; psittacina 47; var. brachystachys 38; var. bracteis omnino coccineis 47b; var. carinata 38; var. decolor 47c; var. duvaliana 39; var. erythrodactylon 31; var. morreniana 49; var. rubro-bracteata 47b; var. truffautiana 34; pycnantha 107.

racinae 182; ranifera 90; rauhii 2; recurvata 48; regina 218, 220, 221, 222; var. glaziouana 220; regnellii 128; reticulata 96; retroflexa 54; rhodostachys; ringens 138; robusta 4; rodigasiana 23; rosea 125e; rostrum-aquilae 34; rubida 61; rubra 84; rugosa 108; ruschii 140.

sanguinolenta 151; saundersii 20b, 27; scalaris 55, 56; var. viridis 56b; sceptrum 86; schenckiana 143; schippii 178; schultesiana 114; schwackeana 18; segadas-viannae 148; selloana 50a; simplex 55; sincorana 17; singuliflora 215; sintenisii 214; socialis 175; soderstromii 77; sparsiflora 134; speciosa 37a; spectabilis 195; splendens 37; splendens major 37b; splendens var. formosa 37b; var. longibracteata 37b; splitgerberi 184; squamosa 40; standleyi 213; stenophylla 208; stenostachya 78; stricta 103; subandina 83; subsecunda 165; sulcata 75; swartzii 137.

tequendamae 10; tessellata 96, 141; thyrsoidea 91; tillandsioides 8; tonduziana 160; triangularis 13; triflora 135; triligulata 101; truffautiana 34; tucumanensis 20c; tuerckheimii 133; turbinata 99; tweedieana Mez 141; tweedieana F. Mueller 20a, 23.

unilateralis 162; urbaniana 151.

vagans 59; vanhyningii 161; vasta 220; veitchii 138; ventricosa 61; verrucosa 177; vexillata 183; viminalis 168; violascens 193; viridiflora 168; viridis 210; vitellina 23; vittata 216; vulpinoidea 33.

warmingii 50c; wawranea 126; werckleana 149; williamsii 212; woodsoniana 158; wrightii 125h.

xiphion 123.

## APPENDIX

### Additions, doubtful and excluded taxa, named hybrids:

NOTE: Unless otherwise indicated, information about hybrids is from Mez, Engl. Pflanzenreich IV. 32:406-410. 1935. BSB = Bromeliad Society Bulletin. G = A. B. Graf, Exotica ed. 3. 1963. R = W. Richter, Zimmerpflanzen von heute und morgen: Bromeliaceen 1962. Sources are followed in capitalization of names of hybrids and in the use of specific names of parents. Correct specific names can be found in the index above.

Vriesea aeris-incola Mez in Mart. Fl. Bras. 3, pt. 3:555. 1894 = TILLANDSIA AERIS-INCOLA (Mez) Mez.

x Africain C. Chevalier = V. LUBBERSII x MEPHISTO, BSB 1:21.

x Alberti André, Rev. Hort. 41:300, pl. 1899 = INCURVATA x (PSITTACINA x CARINATA).

albescens Alv. Silveira, Fl. Montium 2:pl. 131, fig. 2. 1931, nomen, apparently an error for his V. glauca.

albo-nitens Index Kew. Suppl. 1:458. 1906 (error) = VITIS ALBO-NITENS hort.

aloifolia (Hook.) Beer, Bromel. 95. 1857 = TILLANDSIA FLEXUOSA Sw.

anceps Lem. Fl. Serres 5:sub pl. 432. 1849 = TILLANDSIA ANCEPS Lodd.

x Andreana hort. Duval, Rev. Hort. 66:135. 1894 = PSITTACINA x LONGIBRACTEATA.

atro-purpurea Alv. Silveira, Fl. Montium 2:Add. 3, pl. 131, fig. 1. 1931. Identity not resolved.

x aurantiaca Opoix, Rev. Hort. 71:583. 1889 = (x REX) x (x POELMANII).

x aurora hort. Liége, Gartenfl. 42:340. 1893 = (CARINATA x PSITTACINA) x ENSIFORMIS.

x aurora major hort. Liége ex Wittm. Gartenfl. 42:340. 1893 = PSITTACINA x ENSIFORMIS.

x Belgica C. Chevalier, BSB 1:21. Identity?

x bijou hort. Duval, Rev. Hort. 65:213. 1893 - parents?

billbergia Lem. Ill. Hort. 16, Misc.:91. 1869 = TILLANDSIA VIRIDIFLORA (Beer) Baker?

x Boetscheria, BSB 4:58 - parents unknown.

botteri hort. ex Regel, Gartenfl. 33:293. 1884 = TILLANDSIA TRICOLOR Schlecht. & Cham.

x brachystachys major hort. Liége, Gartenfl. 42:339. 1893 = (CARINATA x BARILLETII) x CARINATA.

x brachystachys splendens hort. Duval, Rev. Hort. 64:551. 1892 = CARINATA x PSITTACINA var. RUBROBRACTEATA.

bracteosa Beer, Bromel. 263. 1857, nomen = TILLANDSIA CIRCINNATA Schlecht.

caespitosa E. Morr. ex Baker, Handb. Bromel. 213. 1889 = TILLANDSIA MULTICAULIS Steud.

x candelabrum, BSB 4:55 - parents unknown.

x Cappei hort. Duval, Rev. Hort. 66:285. 1894 = ?

x cardinalis hort. Duval, Rev. Hort. 62:358. 1890 = CARINATA x PSITTACINA var. RUBROBRACTEATA.

carinata var. wawra, BSB 5:43, nomen = ?

x Chantrieri Chantrier, R 279 = ? Leaves dark-banded.

x citrina hort. Opoix, Rev. Hort. 77:127. 1905 = ?

x Closoniana hort. Liége, Gartenfl. 42:431. 1893 = BARILLETII x (CARINATA x PSITTACINA).

x Closoniana brachystachys major, BSB 2:41 = (x MORRENIANA) x BARILLETII.

x Croix d'Honneur C. Chevalier, BSB 1:21 = ? Branched. Bracts lax.

decipiens F. Mueller, Gartenfl. 42:737. 1893 = ? Description inadequate.

x Devansayana hort. Duval, Rev. Hort. 65:202. 1903 = CARINATA x PSITTACINA var. RUBROBRACTEATA.

x Docteur Lebel hort. Duval, Rev. Hort. 70:539. 1898 = CONFERTA x (x REX).

x Donneai hort. Makoy ex Witte, Hybr. Brom. 8. 1894 = BARILLETII x GUTTATA.

x Duchartrei hort. Duval, Rev. Hort. 66:135. 1894 = ((CARINATA x PSITTACINA) x BARILLETII) x SPLENDIDA.

x Ducretii hort. Duval, Rev. Hort. 68:251. 1896 = ?

x Duvalii, BSB 1:21 = error for V. duvaliana E. Morr.?

x Duvalii major hort. Duval, Rev. Hort. 66:135. 1894 = DUVALIANA x (x FULGIDA).

x elegans hort. Duval, Journ. Soc. Nat. Hort. France 1892:706 = (BARILLETII x (CARINATA x PSITTACINA)) x DUVALIANA.

x elegans E. Morr. Rev. Hort. 64:551. 1892 = (BARILLETII x (CARINATA x PSITTACINA)) x (x FULGIDA).

x Elmiriana hort. Duval, Rev. Hort. 69:307. 1897 = ?

x erecta, BSB 8:50 = ?

x eros hort. Duval, Rev. Hort. 69:140. 1897 = CORALLINA var. ROSEA x ((CARINATA x PSITTACINA) x BARILLETII).

erythrodactylon var. striata Seidel, G 1734, nomen. Leaves pale-striped.

x esperanza hort. Duval, Rev. Hort. 69:140. 1897 = (x KITTELIANA) x SAUNDERSII.

Espirito Santo, G 1735 = ?

x Favorite , R 279 = ENSIFORMIS x ? Inflorescence simple. Floral bracts keeled.

x fenestralis var. mortfontanensis Chantrier, BSB 13:99 = FENESTRALIS x TESSELLATA.

x Flaming Sword, BSB 10:39 = SPLENDENS var. MAJOR x SPLENDENS var. LONGIBRACTEATA.

x Flamme Richter, BSB 10:39; R 280, 282 (B), 304 = (x VIGIERI) x BARILLETII.

x flammea hort. Duval, Rev. Hort. 74:27. 1902 = (x VANGEERTII) x JONGHEI

x Flammendes Schwert Richter, BSB 10:39; R 280 = SPLENDENS var. MAJOR x SPLENDENS var. LONGIBRACTEATA.

X fulgida hort. Duval, Ill. Hort. 60:87, pl. 67. 1888 =

ROSTRUM-AQUILAE x DUVALIANA.

x *fulgida* hort. Makoy, Witte, Hybr. Brom. 8. 1894 = INCURVATA x (x MORRENIANA).

x *furcata* hort. Devansaye, Rev. Hort. 69:163. 1897 = PHILIPPOCOBURGII x ENSIFORMIS.

x *gemma* hort. Duval, Gartenfl. 42:340. 1893 = (BARILLETII x (CARINATA x PSITTACINA)) x (DUVALIANA x INCURVATA).

x *Gerbe de feu* C. Chevalier, BSB 1:21 = ? Tall scape. Branched inflorescence. Red bracts.

x *Gigant* Richter, BSB 10:39; R 280 = (x POELMANII) x (VRIESEA SP. x PSITTACINA) x (x VERSAILLENSIS).

x *ginoti* Chantrier, BSB 13:99 = FENESTRALIS x ENCHOLIRION ROSEUM.

*glauca* Alv. Silveira, Fl. Montium 2:Add. 3. 1931. Description inadequate for classification.

*glaucophylla* Hook. Bot. Mag. 74:pl.4415. 1848 = TILLANDSIA FASCICULATA Sw.

*glaucophylla* hort. ex Mez, Engl. Pflanzenreich IV. 32:209. 1935 = HECHTIA TILLANDSIOIDES (André) L. B. Smith.

x *gloriosa* hort. Duval, Rev. Hort. 66:135. 1894 = BARILLETII x INCURVATA.

x Gnom Richter, BSB 10:39; R 280 = CORCOVADENSIS x (x POELMANII).

x *gracilis* hort. Liége, Witte Hybr. Brom. 8. 1894 = AMETHYSTINA x PSITTACINA.

x *grandis* Maron, Rev. Hort. 60:580. 1888 = ?

x *griesseniana* hort. Rev. Hort. 70:231. 1898 = ?

x *griessensii* hort. Duval, op. cit. 246 = the above.

x "Heinrich Schmidt" Mez in DC. Mon. Phan. 9:571: 1896 = (DUVALIANA x ROSTRUM-AQUILAE) x PSITTACINA.

HELICONIOIDES (105):

Var. b. POLYSTICHA L. B. Smith, Phytologia 8:222. Costa Rica.

x *Henrici* hort. Duval, Rev. Hort. 66:239. 1894 = ?

x "Henri Ducret" hort. Duval, Rev. Hort. 70:231. 1898 = ?

*hieroglyphica* "*marginata*", G 1735, nomen. Leaves pale-banded.

HIEROGLYPHICA (146): *V. hieroglyphica* var. *zebrina* Ruschi, Bull. Mus. Nation. Hist. Nat. II. 26:547, fig. 1954.

x *hoelscheriana*, R 270 = ? Inflorescence simple, lax, decurved.

x *illustris* Richter, R 280 = (x FLAMMENDES SCHWERT) x SPLENDENS.

*imbricata* (Vell.) Beer, Bromel. 94. 1857 = ? Based on *Tillandsia imbricata* Vell., but almost certainly a *Vriesea*. Not collected again so far as known.

x *imperialis* hort. Duval, Rev. Hort. 73:53. 1901 = (x MIRABILIS) x (x REX).

x *insignis* hort. Leiden, Gartenfl. 41:1, pl.1362. 1892 = BARILLETII x SPLENDENS.

x "*Inspektor Kolb*" Mez in DC. Mon. Phan. 9:571. 1896 = PSITTACINA var. RUBROBRACTEATA x (ROSTRUM-AQUILAE x DUVALIANA).

x "Inspektor Perring" Mez in DC. Mon. Phan.9:567. 1896 = BARILLETII x GUTTATA.

x intermedia hort. Liége, Gartenfl. 42:340. 1893 = BARILLETII x FENESTRALIS.

x Kienastii hort. ex Focke, Pflanzenmischl. 530. 1881 = CARINATA x PSITTACINA.

x Kitteliana Wittm. Gartenfl. 39:326, fig. 62, 63. 1890 = BARILLETII x SAUNDERSII.

x Komet Richter, BSB 10:39; R 280 = CORCOVADENSIS x (x SCEPTRE D'OR).

x Kramero-fulgida hort. Duval, Journ. Soc. Nat. Hort. France 1893:501 = PSITTACINA var. RUBROBRACTEATA x (ROSTRUM-AQUILAE x DUVALIANA).

legrelleana hort., BSB 15:46. = AECHMEA RECURVATA (Kl.) L. B. Smith.

x leodiensis hort. Liége ex Wittm. Gartenfl. 42:340. 1893 = BARILLETII x (CARINATA x PSITTACINA).

x Leonii hort. Duval, Rev. Hort. 74:27. 1902 = (x REX) x (x MIRABILIS).

x Leopoldi Witte, Gartenfl. 40:476. 1891 = the following.

x Leopoldiana Wittm. Gartenfl. 42:340. 1893; 54:281, pl. 1539. 1905 = SPLENDENS x MALZINEI.

lindenii Lem. Ill. Hort. 16:pl. 610. 1869 = TILLANDSIA CYANEA Linden ex K. Koch.

luschnathii Mez in Mart. Fl. Bras. 3, pt. 3:555, pl. 103. 1894 = TILLANDSIA SPICULOSA Griseb.

x luxemburgensis Opoix, Rev. Hort. 77:127. 1905 = ?

macropetala hort. Rev. Hort. 69:336. 1897 = TILLANDSIA VIRIDIFLORA (Beer) Baker.

maculata (R. & P.) Beer, Bromel. 98. 1857 = TILLANDSIA MACULATA R. & P.

x "Madame Susanne de Smet" hort. Gartenfl. 58:200. 1909 = (x MIRABILIS x (x VANGEERTII).

x magnifica hort. Makoy, Rev. Hort. Belg. 14:186. 1888 = VRIESEA SPLENDENS x GUZMANIA ZAHNII = GUZVRIESEA MAGNIFICA M. B. Foster, BSB 13:85.

x Magnisiana Kittel & Wittm. Gartenfl. 38:343, fig. 1889 = BARILLETII x FENESTRALIS.

x Magnusiana Ind. Kew. suppl. 1:458. 1906 = the above.

x majestica hort. Duval, Rev. Hort. 77:127. 1905 = ?

x Marechaliana hort. Makoy ex Witte, Hybr. Bromel. 9. 1894 = INCURVATA x (x MORRENIANA).

x Mariae André, Journ. Soc. Nat. Hort. France 1889:577; Rev. Hort. 61:300, pl. 1889 = CARINATA x BARILLETII.

x Marie (error) = the above.

x "memoria Moensi" hort. Rigouts, Rev. Hort. 69:307. 1897 = ?

x menelik hort. Liége, BSB 1:21 = ?

x mephisto hort., BSB 1:21 = ?

x minima hort. Duval ex Witte, Hybr. Bromel. 9. 1894 = (x MORRENIANA) x DUVALIANA.

x mirabilis hort. Duval, Rev. Hort. 74:27. 1902 = VRIESEA SPLENDENS x GUZMANIA ZAHNII = GUZVRIESEA MAGNIFICA M. B. Foster.

x Moensiana hort. Makoy, Rev. Hort. 70:246. 1898 = ?

x Morreniana, cf. species 49 above.

x *morreno-barilletiana* hort. Duval, Ill. Hort. 36:103, pl. 91. 1889 = (x MORRENIANA) x BARILLETII.

x *morreno-barilletii* hort., BSB 2:40 = the above.

*musaica* Cogn. & March. in Dallière, Pl. Ornament. 2:39. 1874 = GUZMANIA MUSAICA (Linden & André) Mez.

x *nigricans* hort. Duval, Rev. Hort. 77:254. 1905 = ROSTRUM-AQUILAE x ENSIFORMIS.

x *obliqua*, cf. species 53 above.

x *Papa Chevalier* C. Chevalier, BSB 1:21 = (x MEPHISTO) x PASTUCHOFFIANA.

x *perfecta* hort., BSB 4:38; R 272, 280 = ? Branched. Spikes dense. Floral bracts red.

x *Petersiana* Wittm. Gartenfl. 44:456, fig. 92. 1895 = BARILLETII x GUTTATA.

x *Pleurvicii* hort. Duval, Rev. Hort. vol. 76: p. ? 1894 = ?

x *Poelmanii* hort. Duval, Rev. Hort. 69:307. 1897 =(x GLORIOSA) x (x VANGEERTII).

x *Poelmanii superba* hort. Gartenfl. 58:200. 1909 = the above.

x *Polonia* C. Chevalier, BSB 1:21; 15:69 (pl.), 70 = ?

x *Pommerescheana* Wittm. Gartenfl. 42:129, pl. 1388. 1893 = SPLENDENS x (x MORRENIANA).

x "President Krueger" hort. Duval, Rev. Hort. 73:54. 1901 = (x REX) x PLATYNEMA.

x *President O. Lamarche* C. Chevalier, BSB 2:41 = INCURVATA x BARILLETII.

x *Prince Charles* C. Chevalier, BSB 1:21 = ? Branched. Salmon-pink bracts.

x *Prince Leopold* C. Chevalier, BSB 1:21 = ? Branched. Bracts salmon-pink washed with yellow.

x *procera bicolor* Dutrie, Bull. Hort. 117. 1 June 1947; BSB 11:62 = (x KITTELIANA) x (x BRACHYSTACHYS MAJOR) ?

x *psittacina hybrida* Richter, BSB 10:38; R 280 = PSITTACINA x ?

x *psittacina picta* hort. Liége ex Witte, Hybr. Brom. 10. 1894 = (x MORRENIANA) x BARILLETII.

x *psittacina rubropunctata* BSB 1:21 = error for var. RUBROBRACTEATA probably.

PSITTACINA (47): *Vriesea psittacina* var. *exilis* Neum Ann. Soc. Hort. Paris pl. 1852.

x *psittacino-fulgida* hort. Duval, Journ. Soc. Nat. Hort. France 1893:30 = (DUVALIANA x ROSTRUM-AQUILAE) x PSITTACINA.

*pulverulento-lineata* Carr. Rev. Hort. 60:89, fig. 1888 (sterile) = VRIESEA subgenus ALCANTAREA sp.?

*purpurascens* hort. Bull, Gard. Chron. 1893, 1:413 = NIDULARIUM INNOCENTII Lem.?

x *Quintusiana* hort. Makoy, Tijdschr. Tuinb. 1900:305, pl. 5; Rev. Hort. Belg. 66:285. 1894 = ?

*ramosa* Beer, Bromel. 265. 1857, nomen = TILLANDSIA UTRICULATA.

x *retroflexa* cf. species 54 above.

x *rex* hort. Duval, Rev. Hort. Belg. 1894:217, pl.; Rev. Hort. 79:570, pl. 1907 = (BARILLETII x (X MORRENIANA)) x (CARINATA x PSITTACINA var. RUBROBRACTEATA).

x rex candelabra Chantrier, BSB 1:33 = (x REX) x ?

x rex major hort. Duval, Rev. Hort. 67:582. 1895 = (x REX).

x rex rubis hort. Duval, Rev. Hort. 70:231. 1898 = (x REX).

x rex superba hort. Duval, loc. cit. = (x REX).

x "Ritter v. Fernsee" Mez in DC. Mon. Phan. 9:572. 1896 = CARINATA x PARAÏBICA.

x Roehr's favorite BSB 4:99 = ?

roezlii hort. Linden ex Baker, Handb. Bromel. 207. 1889, nomen = TILLANDSIA ROEZLII E. Morr.

x roseo-lineata hort. Makoy, Rev. Hort. 66:306. 1894 = ?

x rubra Richter, BSB 10:39; R 304 = ?

x St. Joseph, BSB 4:9 = ?

sanctae-crucis S. Moore, Trans. Linn. Soc. II. 4:491. 1895 = TILLANDSIA PARAËNSIS Mez.

x Sanderiana Wittm. Gartenfl. 46:377. 1897 = BARILLETII x (PSITTACINA x CARINATA).

x "sceptre d'or" hort. Gartenfl. 58:200. 1909 = SAUNDERSII x (x GLORIOSA).

x sceptrum hort. (not Mez), Rev. Hort. 70:246. 1898 = above.

schlechtendalii Wittm. and var. alba Wittm. Bot. Jahrb. 11:69. 1889 = TILLANDSIA ANCEPS Lodd.

setacea Hook. Bot. Mag. 60:pl. 3275. 1833 = TILLANDSIA FASCICULATA Sw. var. VENOSISPICA Mez = T. COMPRESSA Bert. ex R. & S.

siebertiana hort. Journ. Soc. Nat. Hort. France 1899:665 = TILLANDSIA LEIBOLDIANA Schlecht.?

x souvenir de Jos. Mawet C. Chevalier, BSB 1:24 = ?

x sphinx hort. Duval ex Witte, Hybr. Brom. 10. 1894 = FENESTRALIS x LONGIBRACTEATA.

x splendens illustris hort., BSB 11:7 = SPLENDENS x (x FLAMMENDES SCHWERT).

x splendens var. cayenne Lecoufle, BSB 13:105 (leaves only)= ?

splendens var. major hort., BSB 11:7; R 269, 277 = horticultural selected clone.

SPLENDENS (37):

Var. c. STRIATIFOLIA M. B. Foster, Bromel. Soc. Bull. 5:92. 1955. Venezuela.

x splendida hort. Duval, Rev. Hort. 64:551. 1892 = CARINATA x (x FULGIDA).

streptophylla E. Morr. Cat. Brom. Liége, 17. 1873 = TILLANDSIA STREPTOPHYLLA Scheidw.

x superba hort. Duval, Rev. Hort. 71:169, 511. 1899 = (x KITTELIANAL x (x REX).

tenuifolia Beer, Bromel. 96. 1857 = TILLANDSIA FLEXUOSA Sw. as to description and T. TENUIFOLIA L. as to basonym.

x tenuis hort. Edinburgh ex Mez, Engl. Pflanzenreich IV. 32: 409. 1935 = PER-PSITTACINA x CARINATA.

tessellata Sanderae hort. Sander, Rev. Hort. 65:202. 1893 = GIGANTEA.

tessellata variegata hort. Gartenfl. 42:305. 1893 = GIGANTEA.

tessellata var. roseo-pictahort., R 277. Leaves with large rose-red spots.

*tricolor* hort. ex Baker, Handb. Bromel. 109. 1889 = PITCAIRNIA MAIDIFOLIA (C. Morr.) Dcne.

*tricolor* Alv. Silveira, Fl. Montium 2:pl. 130. 1931 = error for AECHMEA TRICOLOR Alv. Silveira, op. cit. Add. 2.

x *trifurcata* hort. Duval, Rev. Hort. 65:213. 1893 = ?

*utriculata* Regel, Ind. Sem. Hort. Petrop. 1869:34 = TILLANDSIA UTRICULATA L.

x *Van Ackeri* hort., BSB 11:61, 63 = (x POELMANII) x ?

x *Van Geertii* hort. Duval, Rev. Hort. 68:251. 1896; BSB 11:61 = INCURVATA x ?

x *versaillensis* Truff. Ill. Hort. 36:73, pl. 87. 1889 = DUVALIANA x CARINATA.

x *Vigeri* hort. Duval, Rev. Hort. 70:395. 1898 = RODIGASIANA x (x REX).

x *viminalis erecta* hort., BSB 1:22 = (x POELMANII) x ?

x *viminalis-rex* hort., BSB 11:62 = the above.

*viridis* E. Morr. ex Baker, Handb. Bromel. 204. 1889, nomen = TILLANDSIA SPICULOSA Griseb.

x *Wallonia* hort. Liége, BSB 1:21 = ?

x *Weyringeriana* Wittm. Gartenfl. 39:7, fig. 1. 1890 = BARILLETII x SCALARIS.

x *Wioteana* hort. Liége ex Wittm. Gartenfl. 42:340. 1893 = BARILLETII x PSITTACINA.

*Wirteana* hort. ex Mez, Engl. Pflanzenreich IV. 32:667. 1935 = error for the above.

x *Witteana* hort. Duval, Rev. Hort. 66:435. 1894 = DUVALIANA x (x MORRENIANA).

x "*Witte senior*" Mez In DC. Mon. Phan. 9:572. 1896 = CARINATA x ENSIFORMIS.

x *Wittmackiana* Kittel, Gartenfl. 37:553, pl. 1283. 1888 = BARILLETII x (x MORRENIANA).

XX *Vrieslandsia Prof. Bouillene* C. Chevalier, BSB 1:23 = VRIESEA (x SOUVENIR DE JOS. MAWET) x TILLANDSIA CAESPITOSA Schlecht. & Cham. (= T. MULTICAULIS).

NOTE: The above compilation is doubtless far from complete and should be greatly enlarged when the Bromeliad Society's list of hybrids is published. However, it is hoped that it will prove useful as a general reference until then.

## MISCELLANEOUS NOTES

### TROPICAL AMERICA

BROMELIA REDOUTEI (Baker) L. B. Smith, comb. nov.
*Bromelia karatas* var. *caulescens* Redouté, Lil. 8:pl. 457. 1816.
*Karatas redoutei* Baker, Handb. Bromel. 3. 1889.
*Bromelia caulescens* Kuntze, Rev. Gen. 3, pt. 2:302. 1898, nomen in synon.

BRAZIL (?): Hort. Redouté (Herb.? basis of Redouté, Lil. plate 457 in volume 8).

So far, no herbarium specimen of Redouté's plant has been found, so the type must be the plate and description for the present. If it were to be placed with any known species, it would go with B. serra Griseb. rather than with B. balansae Mez as formerly. However, it differs from B. serra in its nearly naked scape and much larger floral bracts and flowers. Consequently it seems best to consider it one more of the many species described from cultivation and never recollected in the wild.

## COSTA RICA, PANAMA

TILLANDSIA OERSTEDIANA L. B. Smith, sp. nov.

Tillandsia paniculata Cham. & Schlecht. var. costaricensis Mez in DC. Mon. Phan. 9:703. 1896.

Tillandsia rubra R. & P. var. costaricensis (Mez) Mez, Pflanzenreich 4, Fam. 32:458. 1935.

Tillandsia deppeana Steud. var. costaricensis (Mez) L. B. Smith, Phytologia 5:395. 1956.

A T. deppeana Steud., cui affinis, foliorum laminis bicoloribus subtus dense cinereo-lepidotis; spicis patentibus breviter stipitatis, floribus minoribus differt.

PLANT flowering 6-15 dm high. LEAVES rosulate, many, 4-8 dm long, bicolorous, covered beneath with persistent appressed cinereous scales; sheaths subelliptic, large; blades subligulate, attenuate, to 4 cm wide. SCAPE erect; scape-bracts erect, subfoliaceous, densely imbricate. INFLORESCENCE laxly bipinnate; primary bracts exceeding the sterile mostly bracteate bases of the branches, broadly ovate; spikes spreading, lance-oblong, acute, complanate, ca. 9 cm long (fertile) and 3 cm wide; floral bracts imbricate and concealing the rhachis at anthesis, 3 cm long, exceeding the sepals, coriaceous, even, glabrous, carinate; flowers subsessile. SEPALS lanceolate, acute, 25 mm long, carinate, the posterior very short-connate. Pl. VI, fig. 5: Leaf-apex x 1/4; fig. 6: Spike x 1/4; fig. 7: Posterior sepals x 1.

COSTA RICA: Lankester 1526 (GH); Echeverría 221 (GH). Oriri, Oersted s. n. (C, type). Cartago, Wercklé s. n. (GH); alt. 1200 m, 17 Dec. 1948, M. B. Foster 2695 (US).

PANAMA: Chiriquí: Boquete, alt. 1150 m, June 1938, Davidson 825 (F).

## ECUADOR, PERU

TILLANDSIA LATIFOLIA Meyen, Reise 2:45. 1835; Obs. Bot. Itinera in Nov. Act. Nat. Cur. 19, Suppl. 1:437. 1843.

Tillandsia kunthiana Gaud. Atl. Voy. Bonite pl. 53. 1842; L. B. Smith, Phytologia 7:108. 1959.

In 1959, I adopted Tillandsia kunthiana Gaud. as the correct name for this species because I failed to discover the earliest publication of T. latifolia Meyen. I now return the species to T. latifolia along with var. major Mez and var. divaricata (Benth.) Mez.

All three varieties are typical of the arid coastal region, but var. divaricata is distinctly more northern than the others.

## PERU

### PITCAIRNIA PUNGENS H.B.K. var. FLAVA L. B. Smith, var. nov.

A var. PUNGENS petalis flavis differt.

PERU: Cuzco: Prov. Urubamba: Cliff above Inca road 1 km east of Machu Picchu, Valley of Río Urubamba, ca. 80 km WNW of Cuzco, alt. 2550-2800 m, 3 January 1963, *H. H. & C. M. Iltis & D. & V. Ugent 1128* (US, type; WIS, isotype).

### PUYA CORIACEA L. B. Smith, sp. nov.

A *P. angulonis* L. B. Smith, cui affinis, bracteis florigeris quam floribus longioribus sed reflexis, sepalis apiculatis differt.

PLANT flowering about 1 m high. LEAVES ca. 4 dm long; sheaths suborbicular, 55 mm wide, entire, lepidote beneath toward apex, elsewhere glabrous; blades very narrowly triangular, 25 mm wide, covered on both sides with appressed cinereous scales but more or less glabrous above with age and thus distinctly bicolorous, laxly serrate with brown mostly recurved 3 mm long spines. SCAPE erect, 15 mm in diameter, very finely white-stellate, becoming glabrous; scape-bracts erect, densely imbricate, the lower foliaceous, the upper broadly ovate with linear blades, nearly glabrous, pectinate-serrate. INFLORESCENCE simple, strobilate, cylindric, 2 dm long, 6 cm in diameter; floral bracts ovate, acuminate, pungent, 6 cm long, exceeding the flowers but recurved at anthesis, pectinate-serrate, coriaceous but distinctly nerved, nearly glabrous, sublustrous; pedicels obconic, 5 mm long, densely white-stellate. SEPALS lance-elliptic, broadly acute and apiculate, 21 mm long, coriaceous, coarsely and closely nerved, slightly white-stellate at base; petals about 4 cm long, bright green (! Hutchison), barely exceeding the stamens; strongly twisted after anthesis. Pl. VI, fig. 8: Floral bract and flower x 1/2; fig. 9: Sepal x 1.

PERU: La Libertad: Prov. Huamachuco: 40 km above Pullac crossing over Río Chuagon Valley between Río Marañon and Buldibuyo, alt. 3640 m, 7 Aug. 1964, *P. C. Hutchison, J. K. Wright & R. M. Straw 6170* (US, type; UC isotype).

### PUYA GLANDULOSA L. B. Smith, sp. nov.

A *P. meziana* Wittm. atque speciebus aliis generis inflorescentiae glandulis sessilibus differt.

PLANT known only from fragments, probably flowering over 2 m high. LEAVES over 12 dm long; blades very narrowly triangular, over 4 cm wide, obscurely lepidote between the nerves beneath, glabrous above, laxly serrate with broad castaneous antrorse 12 mm long spines. SCAPE unknown. INFLORESCENCE branching (! Hutchison); primary bracts unknown; branches cylindric, rather dense but some of the rhachis visible at anthesis, except for the petals subdensely vestite with minute pale sessile glands; floral bracts suberect at anthesis, linear-lanceolate, acuminate, thin-coriaceous when dry, entire; pedicels slender, to 12 mm long. SEPALS linear-lanceolate, obtuse, 37 mm long, ecarinate, thin;

petals ca. 7 cm long, exceeding the stamens, green (! Hutchison), naked, twisted together after anthesis. Pl. VI, fig. 10: Floral bract and flower x 1/2; fig. 11: Sepal x 1.

PERU: La Libertad: 11 km above Samne, alt. 2290 m, 5 Aug. 1964, P. C. Hutchison, J. K. Wright & R. M. Straw 6123 (US, type; UC isotype).

### PUYA HUTCHISONII L. B. Smith, sp. nov.

P. rauhii in systema mea proxima sed scapi bracteis persistentibus haud nigris nec fragilis, floribus minoribus differt.

PLANT known only at the beginning of anthesis, ca. 1.5 m high. LEAVES over 6 dm long; blades very narrowly triangular, 4 cm wide, paler above, covered with pale appressed persistent scales on both sides, laxly serrate with spreading pale brown 5 mm long spines. SCAPE straight, 12 mm in diameter, densely and finely white-stellate, soon glabrous; scape-bracts erect, the lowest unknown, the others linear-lanceolate, the median serrate, the upper entire. INFLORESCENCE simple, cylindric, 4-5 dm long, rather lax at least toward base, except for the petals covered with a fine pale gray stellate tomentum; floral bracts suberect, narrowly triangular, acuminate, about equaling the sepals of the lowest flowers, elsewhere distinctly shorter, coriaceous; pedicels slenderly obconic, 12 mm long. SEPALS linear-lanceolate, broadly acute and apiculate, 30 mm long, ecarinate, coriaceous; petals 5 cm long, about equaling the stamens, naked, metallic blue (! Hutchison). Pl. VI, fig. 12: Scape-bract x 1/2; fig. 13: Floral bract and flower x 1/2; fig. 14: Sepal x 1.

PERU: Ancash: 1/2 km above Chancos on the road to Vicos, alt. 2875 m, 14 March 1964, P. C. Hutchison & J. K. Wright 4380 (US, type; UC isotype).

### PUYA ILTISIANA L. B. Smith, sp. nov.

In systema mea P. gummifera Mez & Sodiro atque P. asplundii L. B. Smith affinis, a priore bracteis florigeris homomorphis, floribus subsessilibus, a posteriore indumento albido, a ambobus sepalis parvis haud obovatis differt.

PLANT known only from fragments but probably less than 1 m high. LEAVES 3-4 dm long; sheaths suborbicular, castaneous and lustrous beneath becoming cinereous-lepidote at apex; blades very narrowly triangular, pungent, 12 mm wide, covered on both sides with appressed cinereous scales, laxly serrate with pale brown slender curved 5 mm long spines. SCAPE slender, densely and finely stellate-lepidote; scape-bracts much exceeding the internodes, the upper ones thin and drying stramineous but persistent, broadly triangular-ovate with a narrow serrulate blade, cinereous-tomentose. INFLORESCENCE sublaxly bipinnate, slenderly cylindric, 3 dm long, densely and finely cinereous-tomentose; primary bracts like the upper scape-bracts, much shorter than the spikes but their blades sometimes slightly exceeding them; spikes divergent, sessile, densely few-flowered, the lateral to 4 cm long, the terminal 8 cm; floral bracts broadly ovate, acuminate, much exceeded by the sepals; flowers sessile. SEPALS narrowly lanceolate, acute, 14 mm long. CAPSULES subglobose, 12 mm long. Pl. VI, fig. 15: Spike x 1/2; fig. 16: Sepal x 1.

PERU: Apurimac: Prov. Aymaraes: Talus slope with bromeliads, valley of Río Challhuanca, ca. 18 km north of Challhuanca on road to Abancay at km 104 from Abancay, alt. 2700 m, 17 Dec. 1962, *H. H. & C. Iltis & D. & V. Ugent 613* (US, type: WIS, isotype).

### PUYA MACROPODA L. B. Smith, sp. nov.

*P. sanctae-martae* L. B. Smith in systema mea proxima sed pedicellis fructiferis plus minusve applanatis multo majoribus, sepalis valde angustioribus acuminatisque differt.

PLANT flowering ca. 2 m high. LEAVES Unknown but presumably spinose-serrate judging by the scape-bracts. SCAPE straight, slightly compressed, to 3 cm wide, finely white-stellate, glabrous with age; scape-bracts erect, much exceeding the internodes but not completely covering the scape, the lowest unknown, the others elliptic, acute, pungent, subchartaceous, finely white-stellate, densely spinose-serrate near apex. INFLORESCENCE simple, cylindric, nearly 1 m long, subdensely many-flowered, very finely white-stellate, soon glabrous; axis stout; floral bracts soon reflexed, lance-oblong, acute, entire, to 6 cm or longer, exceeding the pedicels, subchartaceous; pedicels slender, ca. 2 cm long at anthesis, becoming stouter, flattened, and 4 cm long in fruit. SEPALS linear-lanceolate, acuminate, ecarinate, 28 mm long at anthesis, 40 mm in fruit, subcoriaceous, nerved when dry; petals 5 cm long, yellow-green (! Hutchison), twisted together after anthesis. CAPSULE very broadly ellipsoid, 25 mm long. Pl. VI, fig. 17: Floral bract and old flower x 1/2; fig. 18: Fruiting sepal x 1.

PERU: Amazonas: Prov. Chachapoyas: Dry slopes overlooking the Río Utcubamba, 11 km west of Chachapoyas on the road to Caclic, alt. 1930 m, 26 June 1964, *P. C. Hutchison & J. K. Wright 5855* (US, type; UC, USM, isotypes).

### PUYA PONDEROSA L. B. Smith, sp. nov.

A *P. herzogii* Wittm., cui affinis, bracteis primariis florigerisque ovatis ex sicco stramineis vel pallide brunneis, sepalis minoribus cum indumento persistente differt.

PLANT flowering somewhat over 1 m high. LEAVES 6 dm or longer; blades very narrowly triangular, rigid, 25 mm wide, bicolorous, covered beneath with whitish appressed scales, glabrous above, laxly serrate with curved castaneous spines 5 mm long. SCAPE straight, 6 cm in diameter at base, soon glabrous; scape-bracts early deciduous but evidently densely imbricate judging by the very short internodes, the lowest subfoliaceous, the others unknown. INFLORESCENCE densely cylindric, 40 cm long, 10 cm in diameter, bipinnate but appearing simple, at first whitish-tomentose except the petals; primary bracts ovate, acute, about twice as long as the axillary spikes and with their apical half reflexed and soon glabrous, entire; spikes subglobose, densely few-flowered; floral bracts ovate, acute, about equaling the sepals, thin; pedicels stoutly obconic, 10 mm long. SEPALS lanceolate, acute, 25 mm long, thin-coriaceous, drying stramineous, their tomentum persistent; petals ca. 4 cm long, exceeding the stamens. Pl. VI, fig. 19: Floral bract and flower x 1/2; fig. 20: Sepal x 1.

PERU: Ayacucho: Prov. Lucanas: Rocky slopes in arid basaltic Tola heath (Lepidophyllum quadrangulare), descent to Lucanas (Puquio) from Paso de Kondor sencha, on Nazca-Puquio Road, "Pampa Galera", alt. 3800 m, 13 Dec. 1962, H. H. & C. Iltis & D. & V. Ugent 445 (US, type; WIS, isotype).

PUYA WRIGHTII L. B. Smith, sp. nov.

P. rauhii L. B. Smith in systema mea proxima sed foliorum laminis utrinque dense lepidotis, scapi bracteis persistentibus longe caudatis haud nigrescentibus differt.

PLANT flowering over 2 m high. LEAVES to 13 dm long; sheaths suborbicular, glabrous toward base; blades very narrowly triangular, caudate-acuminate, 30-45 mm wide, concolorous, densely cinereous-lepidote on both sides, laxly serrate with antrorse brown spines 4 mm long. SCAPE straight, 15 mm in diameter, finely white-stellate, becoming glabrous; scape-bracts erect, exceeding the internodes, the lowest subfoliaceous, the median triangular-ovate, caudate with long linear sparsely serrate blades, the upper lanceolate, bladeless, serrate, densely and finely white-stellate. INFLORESCENCE simple, cylindric, 5 dm long, subdensely many-flowered with the rhachis clearly visible, densely white-stellate except the petals; floral bracts mostly spreading at anthesis, narrowly triangular-ovate, acuminate, to 6 cm long, the lowest about equaling the sepals, the upper much shorter, subcoriaceous, all but the lowest entire; pedicels slender, to 22 mm long. SEPALS narrowly lanceolate, broadly acute and apiculate, 32 mm long, subcoriaceous, strongly nerved when dry, ecarinate; petals with narrow lateral folds, nocturnal, very pale green (! Hutchison), twisted together after anthesis. CAPSULE subglobose, 2 cm long; seeds reticulate, the wing circumferential, cuneate. Pl. VI, fig. 21: Floral bract and flower x 1/2; fig. 22: Sepal x 1.

PERU: Cajamarca: Prov. Jaen: Cliff faces and steep rocky slopes, a little north of Pucará, alt. 1000 m, 12 Jan. 1964, P. C. Hutchison & J. K. Wright 3560 (US, type; UC, isotype).

TILLANDSIA HUTCHISONII L. B. Smith, sp. nov.

A T. marantoidea Rusby, cui verisimiliter affinis, omnibus partibus valde majoribus, inflorescentia ramosissima, spicarum rhachi geniculata differt.

PLANT flowering 1.5-2 m high (! Hutchison & Wright). LEAVES over 8 dm long; sheaths broadly ovate, densely punctulate-lepidote, dark castaneous beneath; blades ligulate, broadly subacute and apiculate, flat, 9 cm wide, minutely and obscurely lepidote beneath, glabrous above. SCAPE unknown. INFLORESCENCE amply 3-4-pinnate, glabrous, red except the petals; primary bracts broadly ovate, acuminate, 10-11 cm long, exceeding the bracteate sterile base of the branch; branches to 47 cm long, the axis flattened, flexuous; secondary bracts scarcely larger than the floral bracts, exceeding the bracteate sterile bases of the axillary simple or 2-3-parted branches; spikes laxly 3-6-flowered, 4-7 cm long; rhachis geniculate, slender; floral bracts subspreading, elliptic, subacute, mostly slightly exceeded by the sepals, thin, strongly and closely nerved with a wide membranaceous margin, ecarinate; flowers subsessile, sometimes somewhat secund. SEPALS narrowly elliptic, obtuse, 17 mm long, unequally short-connate, thin, strongly nerved, ecarinate; petals naked, linear, 4 cm long, white, slightly exceeding the stamens. Pl. VI, fig. 23: Secondary branch x 1/2; fig. 24: Sepals x 1.

PERU: Amazonas: Prov. Bongara: On road to Rioja, 5 km north of the north end of Laguna Pomacocha, alt. 2000 m, 8 Oct. 1964, P. C. Hutchison & J. K. Wright 6801 (US, type; UC, isotype).

TILLANDSIA PIURENSIS L. B. Smith, sp. nov.

T. rubella Baker atque T. barbeyana affinis, a priore foliorum laminis haud ligulatis sed anguste triangularibus, bracteis florigeris laevibus, a posteriore floribus multo majoribus, a ambobus sepalis posticis inter sese connatis differt.

PLANT flowering over 6 dm high. LEAVES probably rosulate, to 45 cm long, obscurely punctulate-lepidote throughout; sheaths broadly elliptic, scarcely distinct, ca. 10 cm long, dark castaneous above, concolorous with the blades beneath; blades narrowly triangular, long-attenuate, 5 cm wide, pale green striated or marmorated dark purple-black (! Hutchison). SCAPE slightly curved but probably ascending, 6 mm in diameter, glabrous; scape-bracts suberect, subfoliaceous, their bases exceeding the internodes but not altogether covering them. INFLORESCENCE bipinnate, 24 cm long, dense at apex, lax below; primary bracts ovate, the lowest slightly shorter than the reduced axillary spikes but with their blades exceeding them, the upper bladeless and less than half as long as the spikes; spikes subsessile with 1-2 sterile bracts at base, the upper spikes lanceolate, acute, strongly complanate, 7-8 cm long, 2 cm wide (fruting), 8-9-flowered; floral bracts imbricate and concealing the rhachis, elliptic, acute, carinate and slightly incurved toward apex, 25 mm long, equaling the sepals, coriaceous, even, glabrous; flowers subsessile. SEPALS linear-oblanceolate, broadly acute, 24 mm long, thin, nerved, obscurely lepidote, the anterior free, the posterior connate for 6 mm, carinate. Pl. VI, fig. 25: Spike x 1/2; fig. 26: Posterior sepals x 1.

PERU: Piura: Prov. Huancabamba: Cliff faces, Río Huancabamba gorge 3-4 km below Huancabamba on the road to Sondor, alt. 2000 m, 16 Sept. 1964, P. C. Hutchison & J. K. Wright 6616 (UC, type).

TILLANDSIA (TILLANDSIA) PLATYPHYLLA Mez, Fedde Rep. Nov. Spec. 3: 37. 1906; L. B. Smith in Macbride Fl. Peru, Bot.Series Field Mus. Nat. Hist. 13:558. 1936, emend. 1966.

Inflorescentia ample tripinnatim paniculata, ramis spicas ad 8 ferentibus; petalis nudis; staminibus exsertis.

PERU: Cajamarca: Prov. Hualgayoc: Between San Pablo and San

Miguel, alt. 1700 m, 2 May 1904, *Weberbauer 3888* (B, type; F phot. 11521). Prov. Jaen: Km 113 between Acapulco and Pucará on the Río Huancabamba, alt. 1000 m, 10 Jan. 1964, *P. C. Hutchison & J. K. Wright 3516* (UC, US).

1024 TILLANDSIA (PSEUDO-CATOPSIS) TETRANTHA R. & P. var. RAMOSIOR L. B. Smith, var. nov.

A var. *tetrantha* et varietatibus alteris inflorescentia tripinnata differt. A *T. bakeri* L. B. Smith bracteis primariis, florigeris floribusque majoribus, et a *T. tripinnata* (Baker) Mez spicarum rhachibus vix angulatis nec geniculatis differt.

PERU: Amazonas: Prov. Chachapoyas: Cerros Calla Calla, 18 km above Leimebamba, km 410 on road to Balsas, alt. 3100 m, 14 June 1964, *P. C. Hutchison & J. K. Wright 5669* (US, type; UC, isotype)

NOTE: In its small primary bracts and large floral bracts *Tillandsia tetrantha* var. *ramosior* is closer to var. *aurantiaca* than to the typical variety.

BOLIVIA

PUYA UGENTIANA L. B. Smith, sp. nov.

In systema mea *P. oxyantha* Mez affinis, sed foliorum laminis supra dense lepidotis, inflorescentiae indumento persistente, floribus longe pedicellatis differt.

PLANT flowering over 2 m high. LEAVES over 1 m long; blades very narrowly triangular, rigid, 6 cm wide, obscurely lepidote between the nerves beneath, covered with appressed cinereous scales above, laxly serrate with castaneous antrorse spines 3 mm long. SCAPE straight, 5 cm in diameter at base, soon glabrous; scape-bracts persistent, exceeding the internodes but covering very little of the scape, the lowest subfoliaceous, the others broadly triangular with short serrate blades. INFLORESCENCE lax, bipinnate, over 1 m long, finely and densely whitish-stellate including the petals; primary bracts like the upper scape-bracts, much shorter than the axillary branches; spikes subspreading, strobilate, subsessile, the central ones to 17 cm long; floral bracts lanceolate, acute, nearly 5 cm long and about equaling the sepals; pedicels slenderly subcylindric, 15 mm long. SEPALS lanceolate, narrowly obtuse, 30 mm long; petals linear, stellate at least toward base. CAPSULES subglobose, 2 cm long. Pl. VII, fig. 1: Floral bract and flower x 1/2; fig. 2: Sepal x 1.

BOLIVIA: Chuquisaca: Prov. Oropeza: Steep rocky slope with Puyas and *Mentzelia*, 29 km ENE of Sucre on the Sucre-Aiquile Road (15 km ENE of Sucre by map distance),alt. ca. 1950 m, 13 April 1963, *D. Ugent 4998* (US, type; WIS, isotype).

BRAZIL

AECHMEA CALATHEOIDES L. B. Smith, sp. nov.

A *Ae. basi-lateralis* (Lem.) L. B. Smith, cui valde affinis, sepalorum partibus liberis serrulatis, pedicellis longis differt.

PLANT caulescent; rhizome 15 mm in diameter. LEAVES few,

rosulate, 7 dm long, densely white-lepidote beneath, glabrous above; sheaths narrow, inconspicuous, entire; petioles 3 dm long, 1 cm wide, channeled, laxly serrate with flat spreading to antrorse 2 mm long teeth; blades linear-lanceolate, attenuate, 3 dm long, 55 mm wide, flat, laxly serrate. SCAPES several, borne below the rosette, horizontal, short; scape-bracts imbricate, elliptic, sparsely serrulate. INFLORESCENCES simple, strobilate, ellipsoid, 5 cm long; floral bracts polystichous, elliptic, apiculate, 25 mm long, thin, densely serrulate, red, densely pale-lepidote; pedicels slender, 5 mm long. SEPALS 22 mm long, connate for 15 mm, the free apices broadly spatulate, apiculate, serrulate. FRUIT globose, 14 mm in diameter. Pl. VII, fig. 3: Inflorescence x 1/2; fig. 4: Fruit x 1.

BRAZIL: Amapá: In shade, forest swamp, wet clay soil, immediately east of Colonia Agricola de Oiapoque, 3° 43' N, 51° 55' W, about 4 km north of mouth of Cricú River, 14 Aug. 1960, *H. S. Irwin, W. A. Egler & L. Y. Th. Westra 47527* (NY, type).

AECHMEA FARINOSA (Regel) L. B. Smith, comb. nov.
AECHMEA FARINOSA var. FARINOSA
*Lamprococcus farinosus* Regel, Ind. Sem. Hort. Petrop. 1868:79. 1869.
*Aechmea farinosa* hort. Makoy ex Regel,loc. cit., nomen in synon.
*Aechmea conglomerata* var. *farinosa* (Regel) Baker, Handb. Bromel. 53. 1889; L. B. Smith, Bromel. Brazil, Smithsonian Misc. Coll. 126:204. 1955.
*Aechmea glomerata* var. *farinosa* (Regel) Mez in Mart. Fl. Bras. 3, pt. 3:316. 1892.

The basonym for *Aechmea farinosa* was antedated by that for *Ae. glomerata* Mez, but the later name was invalid because of Hooker's earlier use of it for another species. Then the substitute name, *Ae. conglomerata*, was later than the basonym of *Ae. farinosa*, so that it becomes necessary to make new combinations for all three varieties of the species.

AECHMEA FARINOSA (Regel) L. B. Smith var. CONGLOMERATA (Baker) L. B. Smith, comb. nov.
*Lamprococcus glomeratus* Beer, Bromel. 105. 1857.
*Aechmea conglomerata* hort. ex Baker, Handb. Bromel. 52. 1889; L. B. Smith, Bromel. Brazil, Smithsonian Misc. Coll. 126:204. 1955.
*Aechmea glomerata* (Beer) Mez in Mart. Fl. Bras. 3, pt. 3:315. 1892, not Hook. 1867.

AECHMEA FARINOSA (Regel) L. B. Smith var. DISCOLOR (Beer ex Baker) L. B. Smith, comb. nov.
*Lamprococcus glomeratus* var. *discolor* Beer, Bromel. 105. 1857, nomen.
*Aechmea glomerata discolor* hort. ex Beer, Bromel. 105. 1857, nomen.
*Aechmea conglomerata* var. *discolor* Beer ex Baker, Handb. Bromel. 53. 1889; L. B. Smith, Bromel. Brazil, Smithsonian Misc.

Coll. 126:205. 1955.

BILLBERGIA BRACHYSIPHON L. B. Smith var. PARAËNSIS L. B. Smith, var. nov.

A var. brachysiphon sepalis inaequalibus, apice latioribus differt. Pl. VII, fig. 5: Sepals x 1.

BRAZIL: Pará: Epiphytic, Breves, 25 May 1958, P. B. Cavalcante 483 (MG 23049, type).

BROMELIA CACHIMBENSIS L. B. Smith, sp. nov.

A B. balansae Mez, cui affinis, ramis infimis basi longe sterilibus, pedicellis gracilibus longioribusque, sepalis majoribus differt.

PLANT known only from the flowering shoot, over 4 dm high. SCAPE ca. 1 cm in diameter at apex, covered with tomentellous pale brownish indument. INFLORESCENCE subcylindric, dense, 35 cm long, 12 cm in diameter, the axes and ovaries densely tomentellous like the scape; primary bracts suborbicular, covering the branches except for the petals, serrate; branches dense, broadly ellipsoid, the lowest with slender sterile naked bases to 3 cm long; floral bracts oblong, broadly acute, exceeding the ovary, obscurely serrulate, carinate, soon glabrous; pedicels distinct, slender, to 12 mm long in fruit. SEPALS oblong, cucullate, conduplicate, 26 mm long, free, entire, soon glabrous; petals 33 mm long, elliptic; stamens connate at base for 10 mm; ovary subcylindric, 18 mm long, epigynous tube narrowly funnelform, 5 mm high. FRUIT broadly ellipsoid, 25 mm long. Pl. VII, fig. 6: Flower x 1.

BRAZIL: Pará: Cachimbo, 9° 20' S, 54° 53' W, 9 Nov. 1955, W. Bockermann 252 (IAN 111630, type).

BROMELIA OLIVEIRAE L. B. Smith, sp. nov.

Habitu foliisque B. agavifoliae Brongn. ex Houllet valde simulans sed pedicellis fructiferis elongatis, sepalis fere duplo majoribus differt.

PLANT known only from fragments. LEAF (only one) with linear blade over 2 m long, maximally 50 mm wide, contracted gradually below to 25 mm, covered beneath with fine appressed whitish scales, glabrous above, laxly serrate with distally antrorse basally retrorse black curved 5 mm long spines. SCAPE stout, to 10 cm long, densely lanate with fine pale brown scales; scape-bracts densely imbricate, elliptic, ample, thin, serrulate, minutely and inconspicuously lepidote, nearly white when dry. INFLORESCENCE subglobose, ca. 15 cm in diameter, dense, many-flowered; axes covered with finely divided pale brown scales; floral bracts linear, broadly acute, conduplicate, thin, very obscurely serrulate, glabrous or nearly so, whitish; fruiting pedicels slender, to 12 mm long. SEPALS like the floral bracts but entire, 25-30 mm long, glabrous; petals imperfectly known, linear, glabrous; stamens with filaments connate for 6 mm; ovary with narrowly funnelform epigynous tube 5 mm long. FRUIT ellipsoid, at least 3 cm long (young). Pl. VII, fig. 7: Flower x 1.

BRAZIL: Pará: Upland rain forest, km 147 of the Belém - Brasília Highway, 17 Feb. 1960, *E. Oliveira 518* (IAN 105255, type).

DYCKIA IRMGARDIAE L. B. Smith, sp. nov.

Habitu *D. reitzii* L. B. Smith valde similis sed sepalis posterioribus alato-carinatis, filamentis ultra tubum petaleo-stamineum liberis differt.

PLANT flowering to 1 m high. LEAVES very numerous in a spreading rosette; blades very narrowly triangular, to 56 cm long, 18 mm wide, subrigid, covered beneath with closely appressed pale cinereous scales, soon glabrous above, laxly serrate with black antrorse curved 2 mm long spines. SCAPE erect, 5 mm in diameter, densely ferruginous-lanate; scape-bracts densely imbricate, narrowly triangular from a broadly ovate base, ferruginous-lanate. INFLORESCENCE simple, densely many-flowered, ca. 3 dm long, densely ferruginous-lanate; floral bracts like the upper scape-bracts, mostly exceeding the flowers; pedicels stout, compressed, 5 mm long. SEPALS ovate, acuminate, 10 mm long, the posterior ones alate-carinate; petals 15 mm long, the blade subrhombic; stamens included, filaments free above the junction with the petals; stigmas subsessile. Pl. VII, fig. 8: Floral bract and flower x 1; fig. 9: Sepal x 1.

BRAZIL: Rio Grande do Sul: Ledge by top of cliff, Caracol, 20 Nov. 1964, *L. B. & R. C. Smith, I. Schultz & Oyara s. n.* (US, type).

NOTE: The species is named in honor of our hostess, Dra. Irmgard Schultz of the Universidade do Rio Grande do Sul.

DYCKIA MARITIMA Baker, Handb. Bromel. 136. 1889.
*Dyckia tomentosa* Mez in DC. Mon. Phan. 9:515. 1896.
*Prionophyllum maritimum* (Baker) Mez, op. cit. 542.

BRAZIL: Rio Grande do Sul: *Tweedie s. n.* (K, type; GH photo). *Sellow Bromel 73* (P, type of *Dyckia tomentosa* Mez; GH photo 3003) Tôrres, *Reitz 4427* (HBR); *Smith & Reitz 5824* (R, RB, US).

NOTE: *Dyckia maritima* Baker is abundant and conspicuous on the rocky headlands at Tôrres and both Tweedie and Sellow must have passed very close to this place. It is more than likely that Tôrres is the type locality for both species.

DYCKIA PARAËNSIS L. B. Smith, sp. nov.

Habitu *D. duckei* L. B. Smith valde similis sed bracteis florigeris quam pedicellis robustis longioribus, filamentis ultra tubum petaleo-stamineum breviter connatis differt.

PLANT flowering 7 dm high. LEAVES many in a subbulbous rosette, 5 dm long; sheaths ample, ca. 4 cm long; blades recurved-spreading, very narrowly triangular, rigid, 25-30 mm wide, covered beneath with closely appressed cinereous scales, soon glabrous above, very laxly serrate with black subspreading 1.5 mm long spines. SCAPE erect, very slender, soon glabrous; scape-bracts remote, very small, acuminate from a broadly ovate base, entire. INFLORESCENCE simple, very lax, over 2 dm long, glabrous; floral bracts like the upper scape-bracts, to 5 mm long;

pedicels spreading, rather stout, 3 mm long. SEPALS elliptic-oblong, broadly rounded, 6 mm long, ecarinate, rather thin; petals 10 mm long, about equaling the stamens, the blades very broadly rounded, carinate; stamens with filaments short-connate above the junction with the petals; stigmas subsessile. Pl. VII, fig. 10: Floral bract and flower x 1; fig. 11: Sepal x 1; fig. 12: Pistil x 1.

BRAZIL: Pará: On sandstone ledges, Santa Cruz dos Martírios, campos of Andorinhas, region of Araguáia, alt. 600 m, 15 June 1953, R. L. Fróes 30030 (IAN 79853, type).

DYCKIA PUMILA L. B. Smith, sp. nov.

A D. duckei L. B. Smith, cui affinis, pedicellis brevibus crasse obconicis differt.

PLANT nearly stemless, flowering 18 cm high. LEAVES many in a spreading rosette, 13 cm long; sheaths suborbicular, 25 mm wide, brown, glabrous, laxly and minutely serrate near apex; blades linear-triangular, pungent, 7 mm wide, thick, laxly serrate with spreading slender brown spines 2 mm long, covered with white scales but glabrous above with age. SCAPE erect, slender, very finely white-lepidote, soon glabrous; scape-bracts small, much shorter than the internodes, ovate, attenuate, obscurely serrulate. INFLORESCENCE simple, lax, few-flowered, 2-5 cm long, very sparsely white-stellate-lepidote; floral bracts like the scape-bracts but entire, to 6 mm long; pedicels broadly obconic, 2 mm long. SEPALS broadly elliptic, rounded and apiculate, 6 mm long, the posterior ones carinate; petals very broadly subacute, 10 mm long, orange; stamens barely exserted; filaments free above the short common tube with the petals; stigma subsessile. CAPSULE subglobose, apiculate, 13 mm long, dark castaneous. Pl. VII, fig. 13: Inflorescence x 1.

BRAZIL: Goiás: Steep rocky talus, at base of cliff face, ca. 50 km south of Caiaponia on road to Jataí, Serra de Caiapó, 17° 12' S, 51° 47' W, alt. 800-1000 m, 25 Oct. 1964, H. S. Irwin & T. R. Soderstrom 7365 (US, type;NY).

DYCKIA SILVAE L. B. Smith, sp. nov.

D. tuberosa (Vell.) Beer in systema mea affinis sed petalorum laminis magnis valde patentibus, stylo nullo differt.

PLANT acaulescent, flowering 66 cm high. LEAVES many in a spreading rosette, 25 cm long; sheaths suborbicular, 3 cm wide, brown, nearly glabrous; blades linear-triangular, rigid, 2 cm wide, thick, laxly serrate with spreading slender brown spines 3 mm long, covered with white appressed scales but glabrous above with age. SCAPE erect, slender, very sparsely white-lepidote, soon glabrous; scape-bracts small but nearly all exceeding the internodes, the lowest with foliaceous blades, the highest broadly ovate, attenuate, slightly shorter than the internodes. INFLORESCENCE simple, subdensely many-flowered, 18 cm long, very sparsely white-lepidote; floral bracts like the highest scape-bracts, serrulate, the lowest about equaling the sepals; pedicels subcylindric, thick, 3 mm long, strongly constricted at base and appearing articulate. SEPALS ovate, obtuse with a wide thin margin, 6-7 mm long; petals yellow, to 17 mm long, the blade broadly rounded, 6 mm wide, strongly carinate and curved spreading; stamens much shorter than the petals, filaments free above the short common tube with the petals; stigma sessile. Pl. VII, fig. 14: Floral bract and flower x 1; fig. 15: Sepal x 1.

BRAZIL: Pará: On rocks in campo, region of Garotire, Mun. Altamira, 8 Aug. 1962, N. T. Silva 784 (IAN 114554, type).

ENCHOLIRIUM GLAZIOVII Mez in Mart. Fl. Bras. 3, pt. 3:505. 1894, emend. L. B. Smith 1966.
Encholirium subsecundum sensu L. B. Smith, Smithsonian Misc. Coll. 126:43. 1955, quoad L. B. Smith 7036, non Mez 1896.

Foliis ad 9 dm longis; vaginis reniformibus, ad 9 cm latis, atro-castaneis, apice dense brunneo-lepidotis, alibi glabris; laminis anguste triangularibus, 5 cm latis, basi spinis latis planis 10 mm longis subdense armatis, alibi laxiore armatis; scapo erecto, 25 mm diametro; scapi bracteis erectis, internodia superantibus, infimis subfoliaceis late vaginatisque, supremis late ellipticis, apice attenuatis, valde serrulatis. Pl. VII, fig. 16: Floral bract and flower x 1.

BRAZIL: Minas Gerais: Without further data, Glaziou 19918 (B, type, F photo 11456). Chapeu do Sol, Serra do Cipó, 19° 40' S, 43° 57' W, alt. 1000 m, 29 April 1952, L. B. Smith & Mus. R. 7036 (R, US).

NOTE: It could well be that L. B. Smith 7036 is topotypic. Glaziou collected in company with Schwacke and on occasion also appropriated the collections of others as his own (Sleumer, Bot. Jahrb. 76:153. 1954), and Schwacke is known to have collected on the Serra do Cipó. L. B. Smith 7036 agrees closely with such parts as are represented in the rather incomplete type.

ENCHOLIRIUM MAGALHAESII L. B. Smith, sp. nov.

A E. subsecundo (Baker) Mez, cui affinis, inflorescentia floribusque valde minoribus differt.

PLANT flowering only about 8 dm high. LEAVES unknown but basal scape-bracts presumably more or less foliaceous. SCAPE erect, slender, glaucous; scape-bracts all longer than the internodes and with inconspicuous sheaths, the lower ones with linear-triangular blades over 2 dm long, laxly serrate and covered beneath with whitish appressed scales, the upper scape-bracts much reduced, narrowly lanceolate, entire. INFLORESCENCE simple, 10-11 cm long, 25-30 mm in diameter, interrupted at base, otherwise dense, glabrous; floral bracts like the upper scape-bracts, exceeding the lowest flowers; pedicels 3 mm long. SEPALS asymmetric, suboblong, subtruncate, 7 mm long; petals narrow, barely exceeding the sepals; stamens exserted; ovary narrowly pyramidal, 12 mm long. CAPSULE ovoid, dark castaneous; seed orbicular-falcate. Pl. VII, fig. 17: Floral bract and flower x 1.

BRAZIL: Minas Gerais: Campo, slopes of Serra de Diamantina, July 1960, M. Magalhães 18056 (IAN 107941, type).

……

GRAVISIA RODRIGUESIANA L. B. Smith, sp. nov.

Ab omnibus speciebus generis adhuc cognitis inflorescentia e spicis elongatis dense digitata differt.

PLANT flowering over 6 dm high. LEAVES 14 dm long; sheaths broadly elliptic, distinct, 20 cm long, dark castaneous, minutely appressed-lepidote; blades very narrowly triangular, 4 cm wide, coriaceous, soon glabrous, sparsely serrate with slender spreading dark 5 mm long spines. SCAPE straight, stout, appressed-lepidote; scape-bracts strict, large and very densely imbricate, drying dark castaneous, the lower subfoliaceous, the upper with short entire involute-subulate blades. INFLORESCENCE bipinnate, globose, densely digitate; primary bracts broadly ovate, mucronate, 35 mm long, even or slightly nerved at apex, red (! Rodrigues), drying to dark castaneous, obtusely carinate, punctulate-lepidote; spikes subcylindric, 10 cm long, 3 cm wide, densely many-flowered; floral bracts closely imbricate in about 5 ranks, broadly elliptic, rounded and mucronate, 30 mm long, equaling the sepals, mostly ecarinate, punctulate-lepidote, green (! Rodrigues), drying stramineous; flowers subsessile. SEPALS asymmetric, 19 mm long, short-connate; epigynous tube infundibuliform, 2 mm high; petals and stamens unknown. Pl. VII, fig. 18: Spike x 1/2; fig. 19: Sepal x 1.

BRAZIL: Amazonas: Mata de baixio, Bosque de Palmeiras, Reserva Florestal Ducke, Manaus, W. Rodrigues 5399 (US, type; INPA 14068, isotype).

ORTHOPHYTUM LEPROSUM (Mez) Mez in DC. Mon. Phan. 9:117. 1896; L. B. Smith, Brom. Brazil, Smithsonian Misc. Coll. 126:80. 1955.

Prantleia leprosa Mez in Mart. Fl. Bras. 3, pt. 3:259, pl. 58, fig. 2. 1891.

BRAZIL: Minas Gerais: Cachoeira do Inferno, Rio Jequetinhonha, Sept. 1820, Pohl 5229 (W, type). Very common in dense masses, caatinga on rock outcrop, between Itaobim and Joaima, ca. 16° 35' S, 41° 15' W, Nov. 1959, M. Magalhães 17598 (IAN 106716).

NOTE: The Magalhães collection must be from very near the type locality and, except for a loss of indument due to wear, it appears to be a close match. The type locality has been given erroneously as in Goiás when actually it is in northeastern Minas Gerais near the remainder of the genus which is limited to northeastern Brazil. The other supposedly western locality for the genus was eliminated when Mulford Foster realized that there had been a label mixture in O. foliosum and that his 1079 of Mato Grosso should have been 881 of Espírito Santo.

PITCAIRNIA IRWINIANA L. B. Smith, sp. nov.

Petalis ignotis, P. ensifolia Mez vel P. karwinskyana Beer in systema mea affinis sed sepalis omnibus late alato-carinatis differt.

PLANT nearly stemless, flowering about 3 dm high. LEAVES many in a fasciculate rosette, the larger ones over 2 dm long; sheaths broadly ovate, 2 cm long, imperfectly known because of fire damage; blades dimorphic, some reduced to subulate dark spinose-serrate spines, others foliaceous, linear, subulate-attenuate, scarcely if at all narrowed at base, 10 mm wide, covered with white appressed scales but becoming glabrous above, deciduous along a straight transverse line, entire except the short persistent spinose-serrate base. SCAPE erect, 5 mm in diameter, white-flocculose; scape-bracts all exceeding the internodes, the lower foliaceous with deciduous blades, the upper much smaller and ovate. INFLORESCENCE simple, dense, 5-6 cm long; floral bracts like the upper scape-bracts, 2 cm long, exceeding the slender 13 mm long pedicels. SEPALS oblong-elliptic, acute, 15 mm long, all broadly alate-carinate; petals and stamens unknown; ovary about 2/3 superior. Pl. VII, fig. 20: Old flower (type) x 1; fig 21: Young inflorescence (paratype) x 1; fig. 22: Same, sepal x 1.

BRAZIL: Goiás: Rooted among boulders, mesa summit, near escarpment, ca. 50 km south of Caiaponia on road to Jataí, Serra do Caiapó, 17° 12' S, 51° 47' W, alt. 800-1000 m, 25 Oct. 1964, H. S. Irwin & T. R. Soderstrom 7347 (US, type; NY). Same, base of escarpment, 26 Oct. 1964, Irwin & Soderstrom 7370 (NY, US).

PITCAIRNIA LIMAE L. B. Smith, Phytologia 7:254, pl. 1, figs. 9, 10. 1960, emend. 1966.

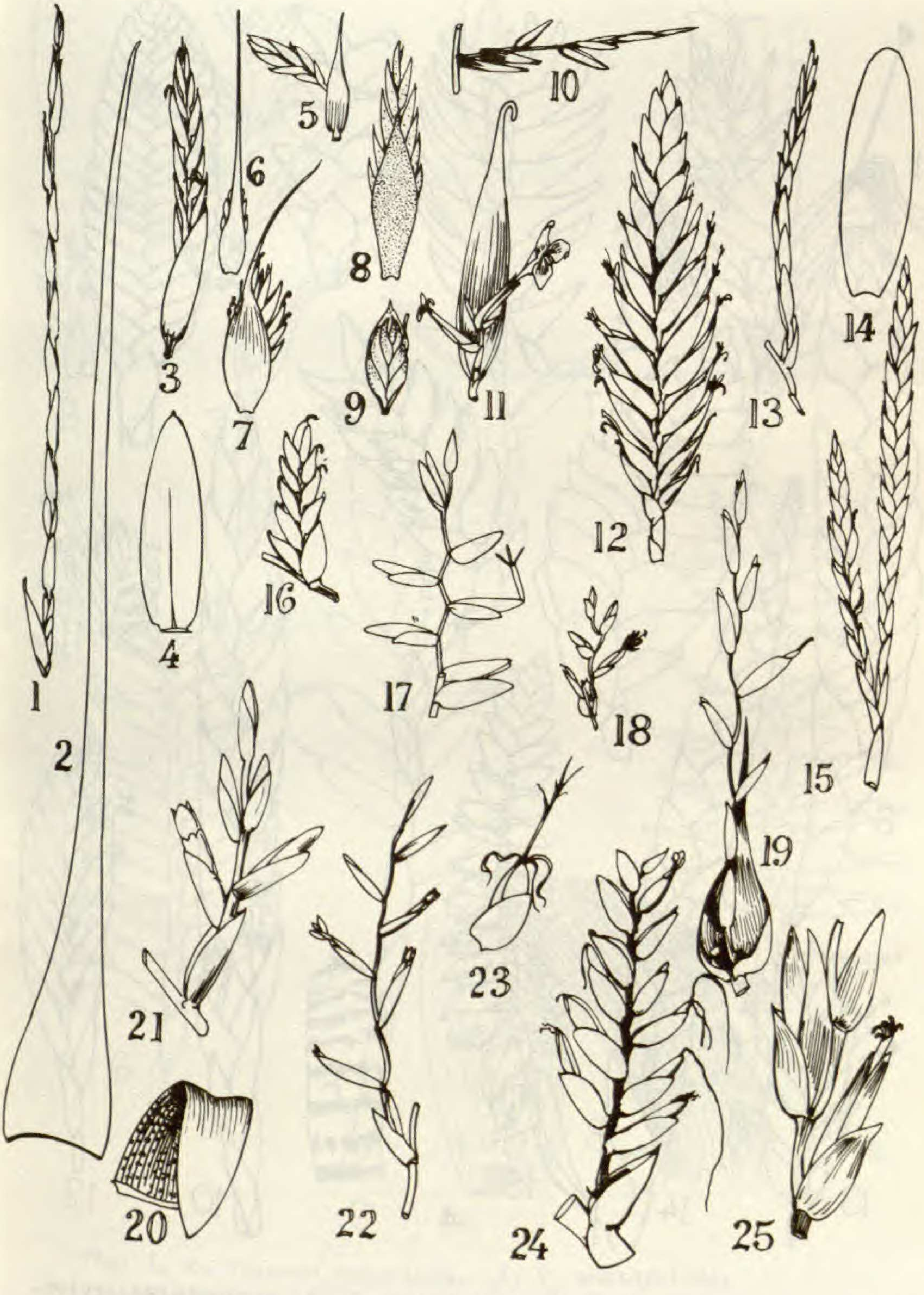
Florifera ad 75 cm alta; foliis multis, homomorphis; vaginis late ovatis, 3 cm longis, atro-castaneis; laminis persistentibus, linearibus, apice longe attenuatis, basi vix contractis, 18 mm latis, subtus densissime cinereo-lepidotis, supra mox glabris, basi laxe spinoso-serrulatis, alibi integris; petalis nudis vel basi ligula auctis.

BRAZIL: Ceará: Serra de Maranguape, cume da Rajada, 14 Sept. 1908, A. Ducke s. n. (MG 1661, topotype).

Plate I

Fig. 1: Vriesea rauhii. 2-4: V. olmosana. 5: V. didistichoides. 6: V. fragrans. 7: V. cylindrica. 8: V. harmsiana. 9: V. tillandsioides. 10: V. lubbersii. 11: V. drepanocarpa. 12: V. gravisiana. 13, 14: V. glutinosa. 15: V. chrysostachys. 16: V. schwackeana. 17: V. friburgensis. 18: V. rodigasiana. 19: V. altodaserrae. 20, 21: V. saundersii. 22: V. procera. 23: V. alta. 24: V. geniculata. 25: V. gigantea.

Plate I



(For explanation see preceding page)

Plate II

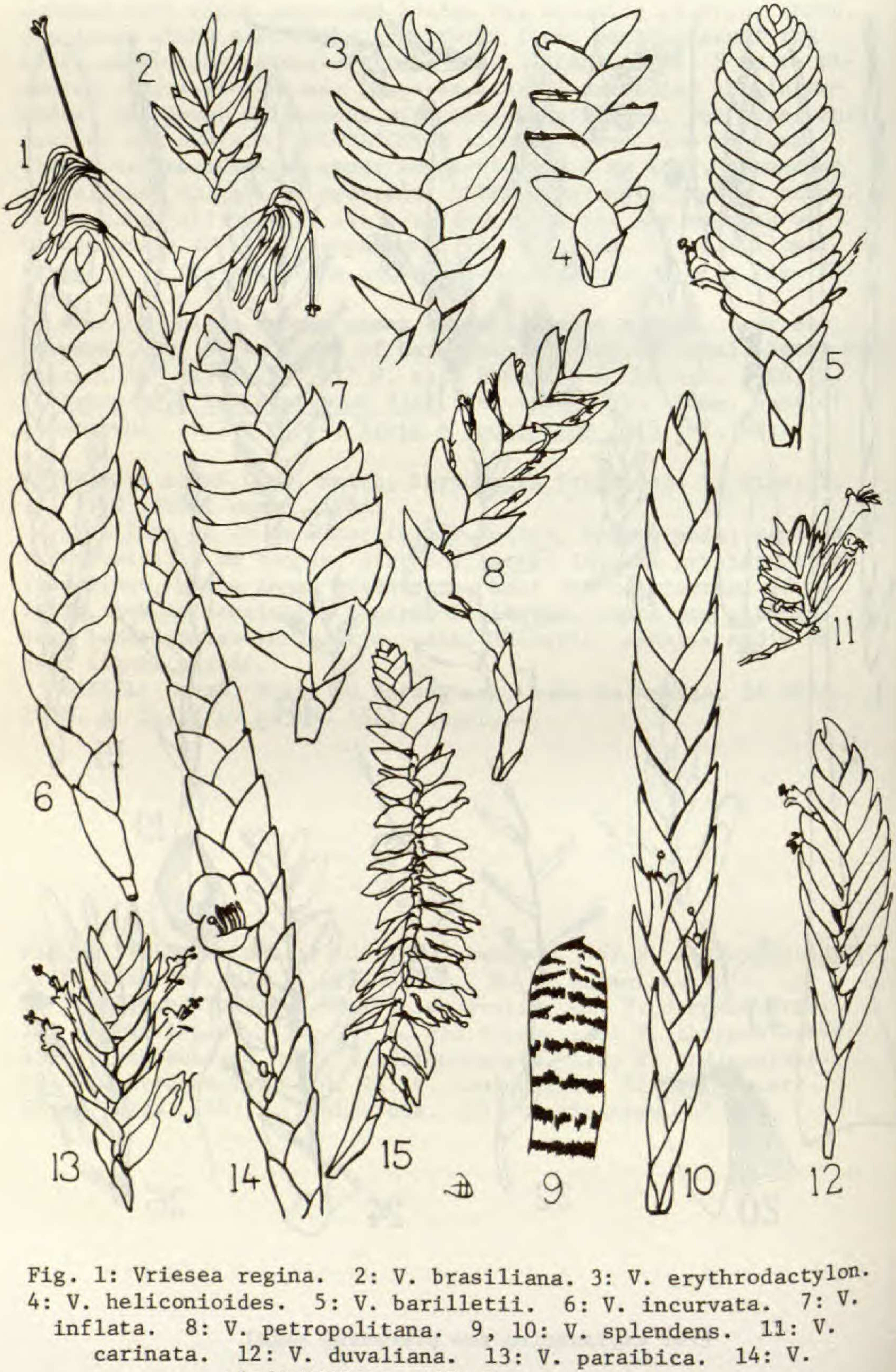


Fig. 1: Vriesea regina. 2: V. brasiliana. 3: V. erythrodactylon. 4: V. heliconioides. 5: V. barilletii. 6: V. incurvata. 7: V. inflata. 8: V. petropolitana. 9, 10: V. splendens. 11: V. carinata. 12: V. duvaliana. 13: V. paraibica. 14: V. gladioliflora. 15: V. ovandensis.

## Plate III

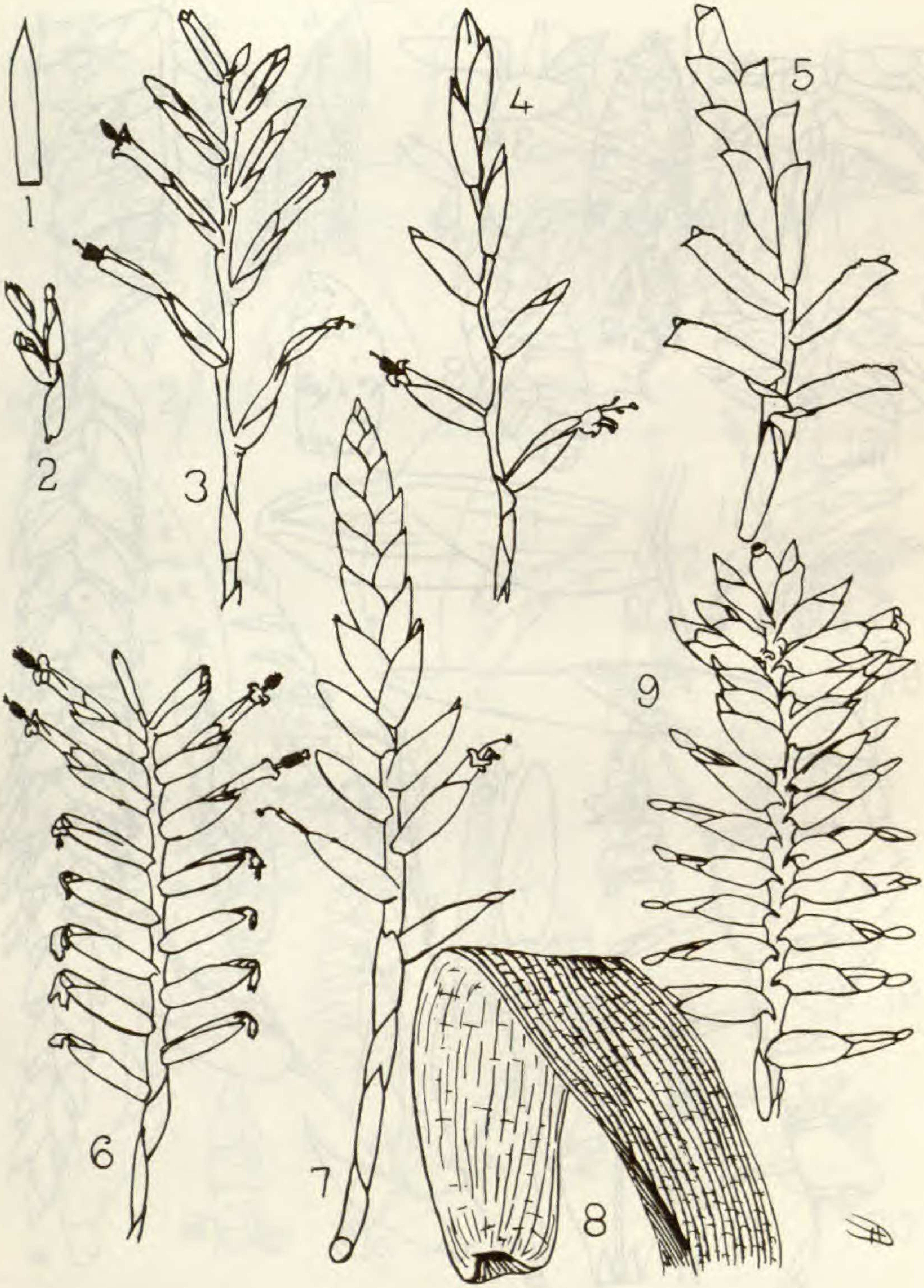


Fig. 1, 2: Vriesea apiculata. 3: V. amethystina. 4: V. psittacina. 5: V. recurvata. 6: V. morreniana. 7: V. ensiformis. 8, 9: V. fenestralis.

Plate IV

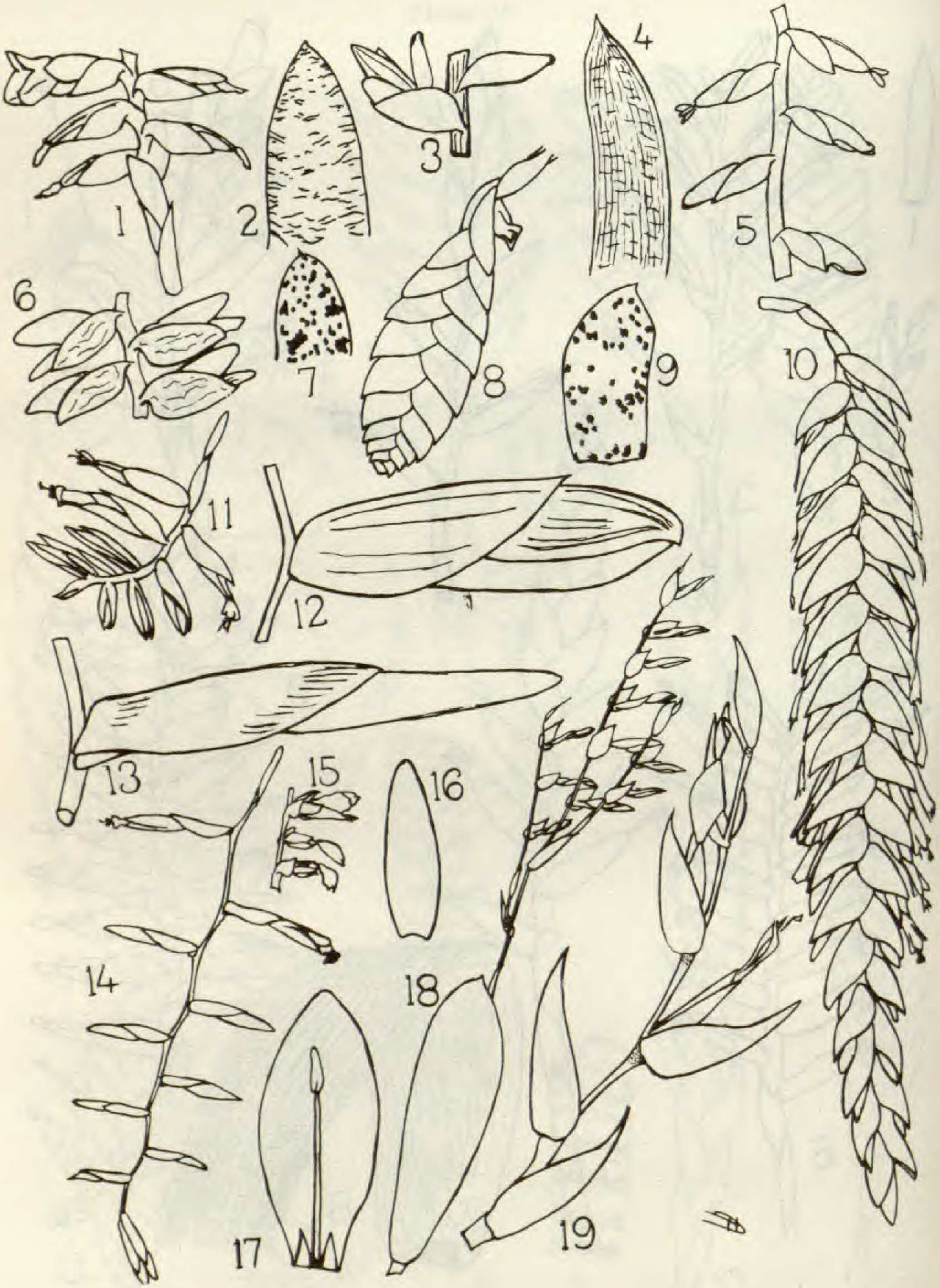


Fig. 1: Vriesea jonghei. 2, 3: V. fosteriana. 4, 5: V. platynema. 6: V. bituminosa. 7, 8: V. pardalina 9, 10: V. guttata. 11: V. retroflexa. 12: V. simplex. 13, 14: V. scalaris. 15-17: V. tuerckheimii. 18: V. philippocoburgii. 19: V. ringens.

Plate V

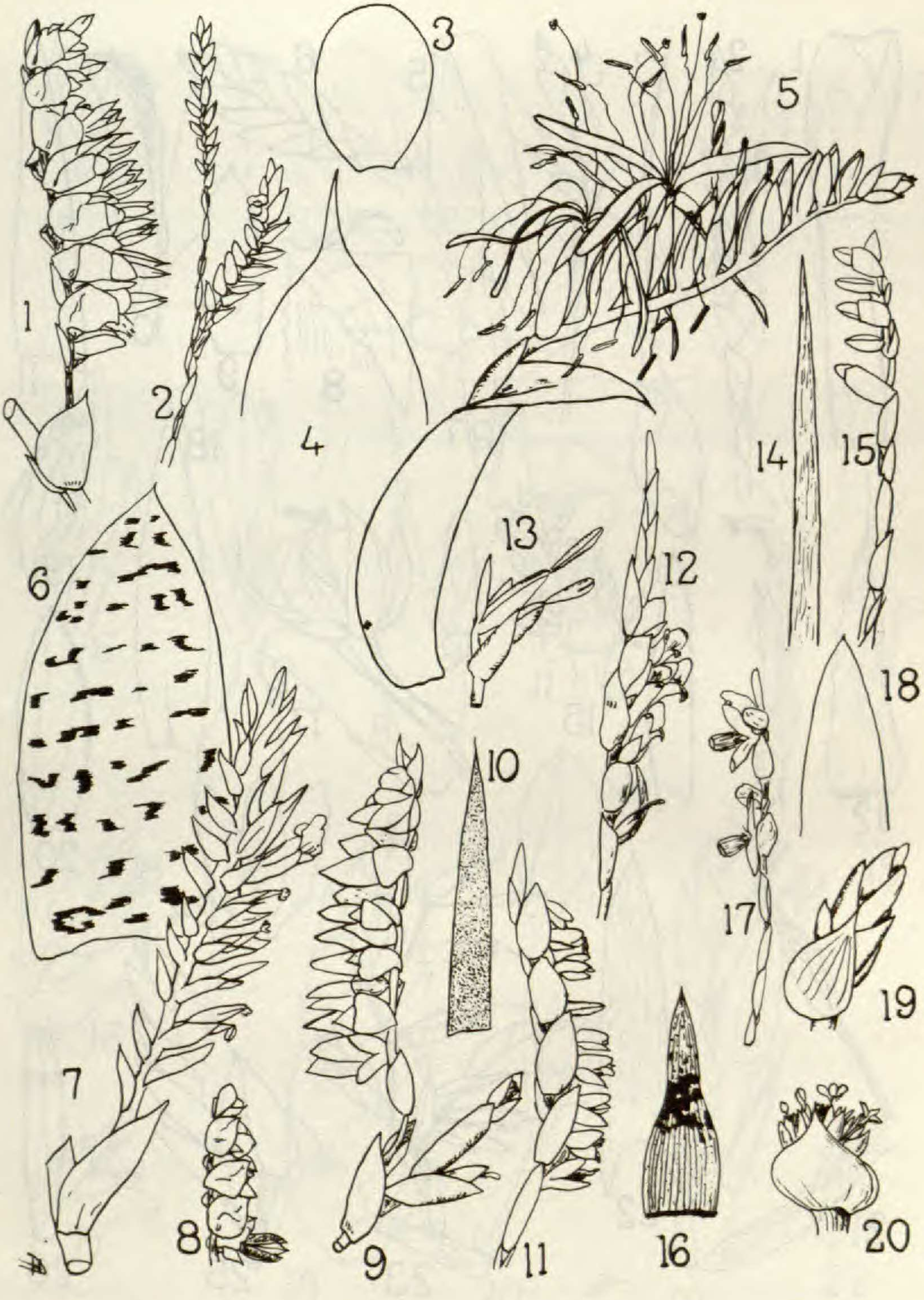


Fig. 1: Vriesea itatiaiae. 2, 3: V. confusa. 4, 5: V. imperialis. 6, 7: V. hieroglyphica. 8: V. werckleana. 9: V. sanguinolenta. 10, 11: V. vanhyningii. 12: V. viridiflora. 13: V. marnier-lapostollei. 14, 15: V. broadwayi. 16, 17: V. racinae. 18, 19: V. splitgerberi. 20: V. capituligera.

Plate VI

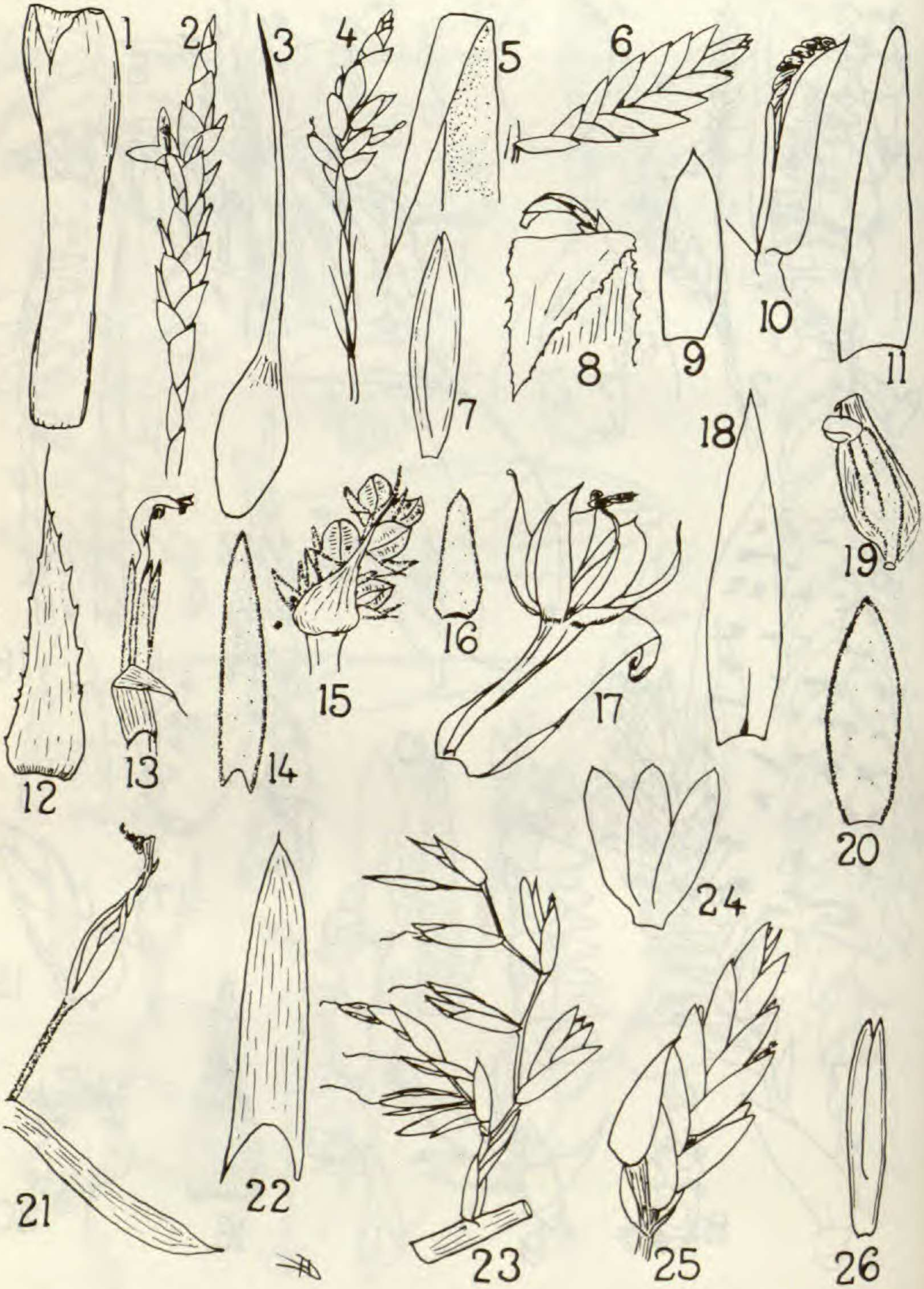


Fig. 1, 2: Vriesea malzinei. 3, 4: V. flammea. 5-7:. Tillandsia oerstediana. 8, 9: Puya coriacea. 10, 11: P. glandulosa. 12-14: P. hutchisonii. 15, 16: P. iltisiana. 17, 18: P. macropoda. 19, 20: P. ponderosa. 21, 22: P. wrightii. 23, 24: Tillandsia hutchisonii. 25, 26: T. piurensis.

Plate VII

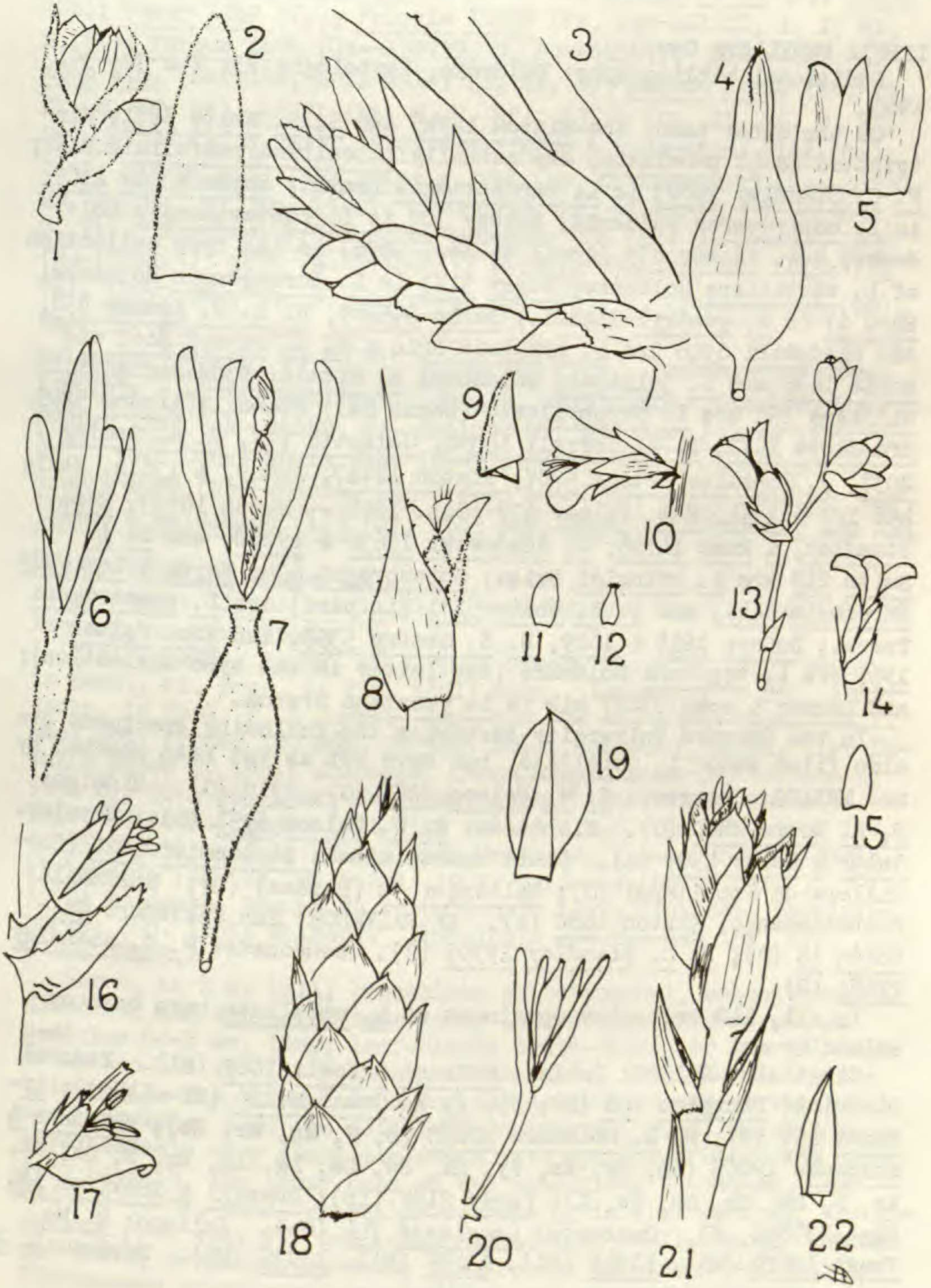


Fig. 1, 2: Puya ugentiana. 3, 4: Aechmea calatheoides. 5: Billbergia brachysiphon var. paraensis. 6: Bromelia cachimbensis. 7: B. oliveirae. 8, 9: Dyckia irmgardiae. 10-12: D. paraënsis. 13: D. pumila. 14, 15: D. silvae. 16: Encholirium glaziovii. 17: E. magalhaesii. 18, 19: Gravisia rodriguesiana. 20-22: Pitcairnia irwiniana.